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ANNUAL REPORT

AND

TRANSACTIONS

OF THE

PLYMOUTH INSTITUTION

AND

Devon and Cornwall

NATURAL HISTORY SOCIETY.

1864-5.

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PLYMOUTH:
ISAIAH W. N. KEYS, 52, BEDFORD STREET.
1865.

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SECRETARIES' REPORT.

1864-5.

There was much that was hopeful in the position and prospects of the Society, at the beginning of its fifty-first session. Five Lecturing Members and fifteen Associates were proposed at the first meeting after the summer recess, and were subsequently elected. The session was opened with a conversazione, and its commencement was further marked by the revival of an old custom, the reading of Reports by various Members on scientific progress,—a practice which, it is hoped, may be continued and extended in future years to a review of Literature and Art.

The following is the list of Lectures, as delivered:—

1864.			
Oct.	3.	Conversazione.	
,,	6.	Inaugural Address	The President.
,,	13.	*Reports on Scientific Progress:—*	
		Geology	Mr. C. Spence Bate, f.r.s., f.l.s.
		Botany	,, I. W. N. Keys.
		Zoology	,, J. Brooking Rowe, f.l.s.
		Ethnology	,, W. S. L. Szyrma, b.a.
		Geography	,, S. Cater.
,,	20.	The Primitive Races of Devon	,, W. S. L. Szyrma, b.a.
,,	27.	On a Cornish Kjökkenmödding	,, C. Spence Bate, f.r.s., f.l.s.
Nov.	3.	Language	Sir J. Bowring, ll.d., f.r.s.
,,	10.	On the Flowering Plants of the Neighbourhood of Plymouth. Part II.	Mr. T. R. A. Briggs.
,,	17.	Art as applied to Town Buildings, with references to Plymouth	,, J. Hine.
,,	24.	The Decoration and Furniture of Houses	,, J. Shelly.

1864.		
Dec. 1.	On the Works of Mr. Ruskin	Mr. F. H. Balkwill.
,, 8.	The Food of the People	,, A. P. Prowse.
,, 15.	Volcanoes	,, A. P. Prowse.
1865.		
Jan. 5.	Conversazione.	
,, 12.	Numismatics: Uses of the Study of Coins	,, W. J. Spry.
,, 19.	The Chinese: Sketches of their History and Customs	,, T. W. Coffin, jun.
,, 26.	Physical Properties of the Atmosphere	,, J. N. Hearder.
Feb. 2.	Louis XIV. and his Times	,, H. Whiteford.
,, 9.	Roman-British Antiquities recently discovered in the neighbourhood of Plymouth	,, C. S. Bate, F.R.S., F.L.S.
,, 16.	Federal Governments	,, A. Rooker.
,, 23.	Some Recent French Scientific Theories	Rev. J. Erskine Risk, M.A.
Mar. 2.	The Holy Places at Jerusalem	,, F. H. Scrivener, M.A.
,, 9.	Slavery in Ancient Rome	Mr. R. F. Weymouth, M.A.
,, 16.	Cuneiform Inscriptions	,, W. J. Spry.
,, 23.	The Nile	,, S. Cater.
,, 30.	The Red Sandstones, Conglomerates, and Marls of Devon. Part III.	,, W. Pengelly, F.R.S.

There were a few unavoidable variations from the prospectus as originally issued. Many of the debates were animated and interesting; but we must regret the rare attendance of some Members who have in former years been accustomed to take a leading part in the discussion of the papers read before the Society.

Of the Lectures, especial notice may be directed to six, as bearing upon subjects connected with the neighbourhood of Plymouth and the two counties:—viz. "The Primitive Races of Devon," which has since been printed, with some modifications, in a local magazine *; "On a Cornish Kjökkenmödding;" "On the

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* See "Clack: A Journal of Literary, Scientifick, and Artistick Talk for One and All in the Counties of Devon and Cornwall."—Nos. 1, 3, & 4.

Flowering Plants of the Neighbourhood of Plymouth," a continuance of a paper read in a previous session; "Art as applied to Town Buildings, with reference to Plymouth;" "Roman-British Antiquities recently discovered in the neighbourhood of Plymouth;" and "The Red Sandstones, Conglomerates, and Marls of Devon," the third and concluding part of a series published in the Transactions of the Society for 1861-62, 1862-63, and the present year.

The Roman-British antiquities found at Fort Stamford, which formed the subject of one of these Lectures, have been presented by Mr. C. Spence Bate, the lecturer, with the concurrence of Col. Owen, C.B., R.E., to the Society, and are deposited in its Museum. Among them are vessels of earthenware and glass, articles of personal adornment, such as brooches, rings and bracelets, and fragments of two bronze mirrors. The latter are of much interest, the discovery of mirrors being comparatively rare. The more perfect of them is remarkable for its ornamentation and for its size, being eight inches in diameter.

The following are some particulars with reference to mirrors previously discovered in this country:—

Southwark (circular, with perforated edges)..	5¼ ins. dia.
Sandwich (circular)	4½ ,,
Caister, near Yarmouth * (circular, with perforated edges)	3¾ ,,
Northumberland, preserved at Chester (rectangular)	

Two mirrors preserved at Bedford, and in Mr. Mayor's collection, are the only ones hitherto discovered, which, in their peculiar Celtic ornamentation, resemble that now deposited in our Museum.

The Museum has been further enriched by the gift of an interesting collection of fossils from Haldon and Blackdown, pre-

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* A mirror resembling that found at Caister, and of about the same size, has been discovered at Copenhagen.

sented by our Corresponding Member, Mr. William Vicary, F.G.S., of Exeter. The collection of Devonian birds' eggs mentioned in a former Report has now been placed in the Museum, and arranged by the donor, Mr. T. R. Archer Briggs. To the collection of fishes there have been recently added specimens of the SPUR DOG-FISH, *Acanthius vulgaris*, and young; the SHORT SUN FISH, *Orthagoriscus mola ;* the ANGLER, *Lophius piscatorius ;* the MAIGRE, *Sciæna aquila ;* and the BOAR FISH, *Capros aper.* All these were taken off the coast of Devon, having been obtained by fishermen, and preserved at the expense of the Society: donations are few and far between. A fine specimen of the Cephalopod, the POULPE *(Octopus vulgaris)*, was presented by Mr. Charles Stewart.

During the summer recess, arrangements were made for three Field Days. The first was spent in the neighbourhood of Liskeard, in visiting Dosmare Pool and the Cheesewring; and the second at Berry Head, in company with the members of the Devonshire Association, the Exeter Naturalists' Field Club, and the Teign Valley Naturalists' Club; the third was prevented by unfavourable weather. The success of such excursions mainly depends on a numerous gathering of Members, and on the giving of timely notice by those who intend to join them, that the arrangements required may be made by the Committee. By failure in either of these respects, the pleasure and advantage of the excursions are materially affected.

In the Library a great deal of work has been done. Much attention has been paid to the completion of imperfect sets; and, by watching the catalogues of the second-hand booksellers, and in other ways, your Secretaries have been enabled to fully complete several valuable works.

The following works among others have been added during the past year:—

The Works of Dr. Thomas Young, F.R.S., 4 vols., 8vo.
The Nile Basin, by Capt. R. F. Burton

Rénan's Nabathean Agriculture
Huxley's Lectures on Comparative Anatomy
Report of Smithsonian Institution, 1862
Chevreul on Colour
Griffiths' Text Book of the Microscope.

With regard to Botany we may observe that, during the past year, our member, Mr. T. R. A. Briggs, has discovered a rose in considerable quantity in hedges and thickets in the neighbourhood of Plymouth, which has been pronounced, by the author of the "Review of the British Roses," to be the *Rosa collina* of Jacquin: a plant not previously known as British. Mr. Briggs has also met with a remarkable violet near Plympton, which possesses characters intermediate between *V. hirta* and *V. odorata*, and may perhaps be a hybrid between these species.

The Treasurer's Balance Sheet will be found in the next page.

It has been thought advisable with this part of the Transactions to complete a volume; and a Title-Page and Index are accordingly given. Future parts will be consecutively paged.

J. Brooking Rowe, F.L.S., } *Hon. Secretaries.*
J. Shelly, }

Athenæum, April 5th, 1865.

An Account of the Expenditure and Income of the Plymouth Institution,

FOR THE YEAR ENDING APRIL, 1865.

	£.	s.	d.		£.	s.	d.
Repairs	6	6	8	Balance due by Treasurer	17	8	11
Printing, &c.	12	4	9	Subscriptions	144	7	6
Lighting, &c.	15	3	9	Rent of Hall, &c.	43	7	6
Taxes	0	16	0				
Insurance	2	15	6				
Salaries	12	0	0				
Interest	8	0	0				
Incidentals	34	16	8				
Museum	9	11	6				
Library	35	19	3				
Cash in hand	67	9	10		£205	3	11
	£205	3	11				
				By Balance in hand	67	9	10

Audited and found correct April 6th, 1865.

(*Signed*) W. J. Spry.
John Long Colley.

(*Signed*) J. Dabb,
A. P. Prowse, } Treasurers.

THE

RED SANDSTONES, CONGLOMERATES, AND MARLS OF DEVONSHIRE.

Part III.

BY W. PENGELLY, F.R.S., F.G.S., &c.

THE

RED SANDSTONES, CONGLOMERATES, AND MARLS OF DEVONSHIRE.

Part III.

BY W. PENGELLY, F.R.S., F.G.S.

In the last paper which I had the pleasure of reading to the Members of this Institution, I gave some account of the principal phenomena exhibited by the Red Rocks in the cliff section, extending from Torbay to the Straight Point[*] east of Exmouth. On this occasion, I purpose taking up the history of the formation where it was then dropped, and following the coast-line from the Straight Point to Charton Bay, near the south-eastern verge of Devonshire, where the Triassic beds disappear beneath the White Lias.

That the section to be investigated is of very considerable extent, will be seen from the following distances and bearings:—

	DISTANCES.	BEARINGS.
From Straight Point to Otterton Head	3 miles	N. 60° E.[†]
,, Otterton Head to High Peake Cliff .	3 ,,	N. 30° E.
,, High Peake Cliff to Beer Head	8 ,,	N. 80° E.
,, Beer Head to White Cliff near Seaton	1 ,,	N. 38° E.
,, White Cliff to Charton Bay........	4 ,,	E. nearly.

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[*] Misprinted "Flat Point" in my second paper.—Trans. Plym. Inst., 1862-3, p. 15, &c.

[†] The distances and directions are measured on the Ordnance map.

The entire coast, however, is not occupied with the Red Rocks: thus, for about two miles midway between Branscombe-mouth and Seaton the cliffs consist exclusively of chalk and other members of the Cretaceous system; and from Culverhole Point to the western end of Charton Bay, about a mile and a half, the cliff is concealed by the effects of the famous landslip of December 24th, 1839. Making the proper deductions for these gaps, and measuring in straight lines the distances between the salient points, the amount of Triassic coast must be about sixteen miles; whilst, if the minor indentations be taken into the account, at least fully fifty per cent. must be added to the estimate.

Though the general direction of the sea-bord is somewhat nearer to that of the *strike* than of the *dip* of the formation, newer and still newer beds, with very few and unimportant exceptions, will be constantly brought under inspection by proceeding from west to east in the manner proposed.

Commencing at Littleham Bay, immediately east of the Straight Point, the entire cliff, with the exception of a comparatively thin overlying deposit of post-cretaceous gravel, is formed of the ordinary dull chocolate-coloured marl, in which, however, greenish tints appear somewhat abundantly, and take the forms of specks, circular patches of variable dimensions, and bands three or four inches in width and several feet in length. When seen from a distance, the bands have the appearance of interstratified light-coloured beds, but on closer examination it is found that they are discontinuous, and that though parallel to, they are not coincident with, the planes of bedding; in fact, they are sections of comparatively short, thin, unconnected, sensibly-parallel zones, which suggest the idea that the prevalent colour of the beds in which they occur has been partially discharged in favour of one of a lighter hue. Occasionally the walls of vertical joints are similarly coloured; a fact probably attributable to the chemical action of water oozing through the joints. Instances occur, also, of the exchange of the red for the greenish hue along the paths of roots which penetrate the marl. But though a joint or a root may facilitate, neither of them is essential to, the chromatic phenomenon; for the bands just mentioned are as compact and free from divisional planes as any other part of the bed.

The marl, which, with its greenish nodules and specks, differs in no respect from that west of the Straight Point, holds unbroken possession of the base of the cliff for about a mile and a half eastward; that is, to within about a quarter of a mile west of Budleigh Salterton. Here it suddenly gives place to a bed which is altogether without a parallel in the Triassic deposits of Devonshire. It consists almost entirely of pebbles, is about one hundred feet thick, rises from the beach at an angle of about 9°, and ascends the cliff diagonally westward until it reaches the summit of West-down, the loftiest point on this part of the coast, and which is 424·5 feet above the mean-tide level. Here its outcrop is a steep westerly-sloping scarp, which is continued along and, indeed, forms the high ground of Black Hill, Woodbury Common, Aylesbere, and Straightway Head, a distance of from nine to ten miles, in a direction nearly due north, or, as nearly as possible, that of the river Otter, a very few miles eastward.

The pebbles of which the bed mainly consists are highly-polished ellipsoidal fragments of fossiliferous quartzite, varying from the size of hazel nuts to that of a man's head. Nothing resembling them, either in composition or in fossil contents, occurs elsewhere in the Triassic Conglomerates, or in the parent rocks of Devonshire; lithologically and palæontologically they are strangers to our county, and their forms and polish show that they have travelled long and probably far. Occasionally, pebbles of white quartz and other rocks are found embedded *within* them. In the bed there are also a few fragments of quartz rock, schorlaceous rock, lydian stone, and of a remarkable breccia, supposed to be of volcanic origin. The interstices between the pebbles are filled with sand, but the whole mass is so slightly adherent that it cannot be appropriately termed a Conglomerate; the local name of

"Pebble Bed" or "Popple Bed" very correctly indicates its character. Being thus a loose aggregation of materials, it is not surprising that the bed yields to the action of denuding agencies more rapidly, perhaps, than any other member of the Triassic series; and when it is remembered that fragments of the associated Marls and Sandstones are very soon converted into mud or sand, we have an explanation of the facts that the waste of this bed has furnished the great bulk of the materials which compose the extensive modern beach at Budleigh Salterton, and that the supply is so liberal and continuous as to allow of a very large deportation, partly by man for road making, and partly by the waves to assist in the formation of beaches towards both the east and the west. The quartzite pebbles have been found as far east as Pinnay Bay, where they are still polished ellipsoids. A journey over nearly twenty miles of rocky coast succeeds in reducing their dimensions, but not in changing their forms; all that travel could do for them in the latter particular had been achieved by the old Triassic waves.

The upper and lower surfaces of the bed are well defined, and conform strictly to the overlying and underlying strata, so that, as a whole, its dip is precisely that of the Trias of the district; but all that can be said of the pebbles is that, perhaps, the longest axes of a majority of them have approximately the same dip as the entire bed; the exceptions to this, however, are so very numerous that the materials can scarcely be said to have a stratified arrangement.

Lenticular patches of fine red sandstone are somewhat numerous in the bed; some of them are estimated to be about four feet in greatest transverse diameter, and from forty to fifty feet in length. Each is made up of materials distinctly stratified in planes whose sections are parallel to its longest axis; this is also the direction which the immediately surrounding pebbles have assumed. In different patches, however, the inclination varies considerably. There does not appear to be any marl in the bed, but it contains bands of ferruginous matter, locally termed "Pan."*

With the exception of two thin beds of sandy marl—one immediately, but not persistently, succeeding this strange accumulation of pebbles, and the other being somewhat higher in the series—the overlying beds are fine-grained red sandstones, which extend to the village of Budleigh Salterton. The second of these superjacent strata, upwards of seventy feet above the "pebble bed," contains, at considerable intervals, a very small number of the true quartzite pebbles, but no trace of them has been detected elsewhere. The irruption, therefore, of this vast horde of rock-fragments was sudden, unheralded, and unrepeated.

On comparing this bed with the so-called Conglomerates which extend from Exmouth southwards, several prominent points of difference present themselves. 1st.—Whilst in the older beds a large proportion of the materials are angular or, at most, subangular, in the newer accumulation they are all well-rounded and polished. 2nd.—Whilst the fragments forming the lower strata were derived from parent beds in almost immediate proximity, no part of Devonshire could have furnished those which make up the "pebble bed." 3rd.—A north-easterly transportation, such as is, on the whole, indicated by the phenomena of the more ancient strata, fails to account for either the positive or the negative facts of the more modern bed. A current or other agent moving from the south-west could neither supply the fragments of quartzite, nor fail to bring Devonian and Carboniferous detritus. 4th.—Whilst the accumulation south of the Exe is made up of comparatively thin, well-defined, easily-separable, and distinctly stratified beds, that north of it is one thick and undivided heap of ill-arranged fragments.

It is obvious that results so very dissimilar must be regarded as consequences and proofs of unlike conditions, which, acting almost within the same area, suggest the probability of a wide separation in time.

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* See Transactions of the Plymouth Institution, 1862-63, page 8, &c.

The following are amongst the questions which the geologist desires to put respecting these remarkable pebbles :—

1st.—Whence came they?

2nd.—To what period in the earth's history do the rocks of which they are remnants belong?

3rd.—What information can they give respecting the local distribution of land and water, when they travelled to what is now south-eastern Devonshire, and also during the earlier period when the parent rocks were formed?

4th.—Why was their transportation confined to so limited a portion of the Triassic era that, in the many miles of red cliff between Torbay and Dorsetshire, they are restricted to a bed of no more than about one hundred feet in thickness?

5th.—Why had they the monopoly of the zone they occupy?

The attention of the scientific world was first called to these pebbles by Mr. Vicary of Exeter, who, for some years, has industriously collected the fossils they contain, and who, jointly with Mr. Salter, the eminent palæontologist, read a paper on them before the Geological Society of London, in December, 1863.* From this communication it appears that answers to some of the foregoing queries have been satisfactorily made out: thus Mr. Salter states that amongst the fossils, he has already detected upwards of thirty species, including plants, annelids, crustaceans, and mollusks; that, with the doubtful exception of the Dodman district in Cornwall, no rock within the British area could have supplied them; that not a shade of difference can be detected between these fossils and those from May and Jurques, near Caen in Normandy; that whilst their exact horizon cannot be determined at present, they are certainly of lower Silurian age; that when co-ordinated with the British Silurian deposits, they may represent an upper portion of the Llandeilo Flags, or the Caradoc Sandstone, or, though not quite so likely, the Lower Llandovery Rocks; and that, like the pebbles in question, the Normandy beds are quartzites; so that there is the closest lithological as well as palæontological resemblance between the two series.

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* Quart. Journ. Geol. Soc., vol. xx., p. 283, &c., (1864).

The difficulty, just hinted at, of establishing the exact co-relation of the Norman with the British Silurian deposits, arises from the fact that the Silurian fossils of this country belong to what is known as the Scandinavian type, which is traceable along the whole northern zone from Siberia to Canada; whilst those of Normandy represent the mid-European type, of which, so far as is known, no example occurs *in situ* in Britain, excepting, possibly, the Cornish district previously mentioned. To account for this remarkable fact it has been supposed that a broad barrier of land, running east and west along the line of the Bristol Channel, so effectually separated the Lower Silurian seas of the Scandinavian area, including what is now Wales, from the contemporary mid-European waters, which embraced what are at present known as Devonshire, Cornwall, Normandy, Brittany, Spain, and Bohemia, as to prevent the commingling of the marine organisms of the two provinces. Mr. Salter is of opinion that the arguments in favour of this tract of land, in the Silurian era, are supported by the phenomena of the Budleigh Salterton pebbles. Accepting this hypothesis, the probability of finding fossils common to the two areas is no greater than that of meeting with the same organisms in the Red Sea and the Mediterranean, or in the Caribbean Sea and the Bay of Panama; that is, unless it can be shown that in earlier periods of the earth's history organic provinces were very much larger than they are at present.

Whilst the palæontologist just named has no doubt that to find rocks *in situ* containing the fauna of the pebbles we must now cross to the coast of France, he supposes that similar beds once existed much nearer to south-eastern Devonshire. I confess, how ever, that I am, by no means, convinced of a close proximity, for though composed of a quartzite so hard as to have been largely and preferentially used as a road stone for several years, the pebbles are so well rounded and so finely polished as to indicate not only long and distant travel, but, as has been stated, that further abrasion would fail to change them in these particulars. Again, had the Old Lower Silurian beds been at all near to what is now South Devon, it is difficult to understand why not even a fragment of them has ever been detected in the voluminous Triassic beds between which the layer of pebbles lies like a mere film.

It was hinted in a previous paragraph that possibly similar fossils exist near the Dodman, one of the prominent headlands on the south coast of Cornwall. The rocks in the district here referred to, like the pebbles and the Normandy beds, are quartzites, and were first announced to be fossiliferous in 1837 by Mr. Peach.* In 1846, Sir R. I. Murchison, having inspected the fossils and visited the chief localities, pronounced the rocks to be Lower Silurian†, and this decision was confirmed by Professors Sedgwick and M'Coy, who visited the district in 1851.‡

Having learned that Mr. Peach had lodged in the Penzance and Truro Museums such of the fossils, just mentioned, as he had collected, Mr. Vicary, Dr. Scott, and I went into Cornwall early in July last (1864) for the purpose of examining them and the rocks in which they were found. The fossils are in many cases so fragmentary or indistinct that identification is by no means easy, nevertheless we succeeded in detecting among them several specimens of one of the Budleigh Salterton species of *Brachiopoda.* Having been furnished by Mr. Peach with all needful information, we were so fortunate as to secure the assistance of one of his old collectors, who conducted us to the fossiliferous beds of the Great Cairn and Great Peraver near Goran Haven. In the Peraver we succeeded in finding fossils having the same general facies as those of the "pebble bed," and inhumed in quartzites identical in structure and even in hue with the pebbles of South Eastern Devonshire.

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* Trans. Royal Geol. Soc., Cornwall, vol. vi., p. 12, &c.

† *Ibid*, vol. vi., p. 317, &c.

‡ Quart. Journ. Geol. Soc., vol. viii., p. 13.

In the same month (July, 1864) Mr. Salter, writing on this subject, said "this" [the Dodman district] "seems to be the counterpart of the Normandy rocks and to contain several of their characteristic fossils." * Sir R. I. Murchison, however, had long before this remarked "that the band of siliceous grits and quartzites in the South of Cornwall presents much of the character and aspect of the opposite rocks of Brittany, which the French geologists have mapped and described as Lower Silurian."†

Here then we have, on each side of the western part of the English Channel, contemporary Silurian deposits charged with fossils betokening deposition within one and the same ocean basin, and which are, not improbably, remnants of a formation which once occupied the intermediate portion of the Channel itself; it is possible, therefore, that during the Triassic era fragments travelled to the modern Budleigh Salterton district from some portion of this mid-channel formation. The direction of transportation certainly differed from that of the materials of the older Triassic conglomerates between Torbay and the river Exe, and we have thus an indication of some change in, at least, the local physical geography.

That, during Triassic times, an unobstructed sea lay between the Silurian area and south-eastern Devonshire, is proved by the fact that rock fragments travelled from one to the other; but, though open, this sea was necessarily shallow, for it is not consistent with what we know of the transporting power of water, to suppose that large stones could have been conveyed through depths equal to those which now exist in that part of the channel which is under consideration, and which exceed thirty fathoms. Moreover, since the "pebble bed" rises from the sea level to heights of at least eighty fathoms, the channel, had it then existed, must have

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* Geol. Mag., vol. i., p. 9. † "Siluria," 3rd edition, p. 160-1, (1859).

been correspondingly deeper than at present; hence it appears that the submarine valley separating England from France commenced its existence in post-Triassic times.

As was previously stated, the rocks of the extreme south of Devonshire are crystalline schists; rocks of the same general character occur at the Lizard, the southernmost point of Cornwall; and the famous Eddystone rock, lying almost in the right line joining the two districts just named, is another variety of the same series; they are all highly metamorphosed formations, that is to say they are, according to modern geology, ordinary stratified detrital accumulations which have been so transformed as not only to have acquired a crystalline structure, but, with the exception of their stratification, to have lost all indications of their mechanical sedimentary origin. There is little or no doubt that these Devonshire and Cornish schists, at least as such, are contemporaries; their exact geological age, however, has long been considered to be problematical. It has been the common, though not invariable, practice to regard them as the oldest rocks in the two counties; but this, though probably the truth, has had no better basis than the doctrine, now exploded, that the first formed strata were crystalline, and *vice versâ.* I incline to the opinion that the quartzite pebbles of Budleigh Salterton may be found to have suggested the solution of this problem. Quartzite belongs to the series of metamorphic rocks, but the change it has undergone is generally much less marked than that of the crystalline schists; in the case before us even the fossils are far from being obliterated.

That both the quartzites and the schists had undergone their metamorphosis prior to the Triassic era is proved by the facts that the "pebble bed" so frequently mentioned consists almost entirely of fragments of the former, and that the well-known Triassic outlier at Thurlestone in Bigbury Bay is very largely, if not exclusively, composed of the débris of the latter.

Briefly, then, the facts are these. 1st—An axis of highly metamorphosed rocks runs nearly east and west from the Start to the

Lizard. 2nd: on the north and on the south of this line—in Cornwall in the one case, and Normandy and Brittany in the other—occur two contemporary Lower Silurian groups of rocks, each containing fossils exclusively of the mid-European type, and characterized by a similar and comparatively low degree of transmutation. 3rd: the metamorphosis of both the central and lateral groups was of pre-Triassic date.

From these data I incline to the opinion that all the rocks in question—the Cornish and Norman quartzites, and the schists of Devonshire and Cornwall—are portions of one and the same Lower Silurian formation, which in probably late Palæozoic times underwent transformation, the action of which was most intense along the Start and Lizard axis, and diminished on both the north and and south of it.

I have dwelt at some length on the pebbles and their suggestions, from a belief that they afford an excellent example of the kind of evidence which geologists have to collect, and that they strikingly illustrate the proposition that facts, however unimportant in themselves, may have wide-spread and far-reaching connexions, and may be capable of disclosures of high interest and importance.

The valley in which Budleigh Salterton stands is separated from that of the Otter by a small hill which, at its western end, mainly consists of sandstone differing in many respects from that immediately west of the village. It is yellowish-red, quartzose, micaceous, very ferruginous, and contains small angular and rounded stones. Owing to the concretionary character and unequal distribution of the iron, the sandstone cliff weathers very irregularly, and assumes botryoidal and other grotesque forms. These concretionary masses, in some instances at least, also contain a somewhat large amount of carbonate of lime. Towards the eastern extremity of this hill the concretions disappear, the sandstone becomes finer, and thin layers of marl are interstratified.

Immediately east of the Otter the cliff consists of red sandstone without marl, but interstratified with thin beds of very hard and compact conglomerate, altogether unlike the "pebble bed," and differing almost as much from the breccias south of the Exe. Cross or diagonal stratification frequently occurs in even comparatively coarse conglomerates as well as in the sandstone, and the botryoidal and other concretionary forms are very prevalent.

Whilst the Triassic coast has everywhere retreated before the sea, there are in different districts peculiarities in the modes of retrocession. In Torbay the waves have formed numerous caverns in the cliffs, near Dawlish they have left comparatively small insulated masses as mementoes of an ancient coast-line, and at the Straight Point, by a concentration of their powers, they have hollowed out a cavern about 70 feet long, and, at the entrance, 12 feet wide by 10 feet in height. But east of this point, for a distance of from five to six miles, there are neither caves nor islets; a few salient points, such as Otterton Head, have offered a sturdier resistance than usual to the encroachments of the sea, but generally the coast has fallen back with tolerable uniformity. In Ladrum Bay, however, about two miles from Sidmouth and immediately west of the hill known as the High Peake, there is a combination of the Torbay and Dawlish characteristics. A group of islets occupies the bay, and in some of them caverns have been scooped out, whilst others are completely tunnelled: the effect of the whole is singularly picturesque.

East of the "Pebble Bed" there is but little marl in the cliff section until reaching Ladrum Bay, where a small patch caps the red sandstone. In consequence, however, of a vertical fault, which throws the country down on the west, or raises it on the east, to the amount of probably about 50 feet, it disappears almost immediately; but, on account of the rapidity with which the cliff springs up on the east of the fault to form the lofty High Peake, the marl is again brought in, and over it lies the most westerly Greensand outlier which appears on the *immediate* coast. This again is capped with Supracretaceous gravel; hence this single hill represents not fewer than three of the great geological periods. Its basement is red sandstone overlaid with red marl, both belonging to the Triassic period, and each destitute of fossils; on them reposes the Greensand crowded with organic remains of the Cretaceous era; and this, in its turn, supports gravel rich with chalk flints, which was probably laid down in Quaternary times, and certainly after the valleys of south-eastern Devonshire had been formed, since it lines all the valley slopes and crowns the summits of all the hills bounding them, from the Teign eastward, at least to Dorsetshire.

Standing on the High Peake and looking eastward, it is seen that its leading phenomena are repeated in every hill as far as the eye can reach; everywhere the strongly contrasted colours indicate that the basement is of Triassic, and the higher levels of Cretaceous, age. The deep, yet in most cases gently-sloping, and therefore wide, valleys testify that they were formed by the denudation of large masses of the formations represented by the hills; the gravels show that this excavation was completed before their era, yea, they show that the valleys were deeper and wider in pre-gravel times than they are at present. They indicate a period in which they spread far and wide over the country, covering the hill tops and obliterating the valleys; and, though apparently destitute of fossils, they contain lithodomized stones, and thereby suggest that they were laid down during a period when the country gradually sank many hundred feet below its present level, until the ocean prevailed over our hills; and that the valleys were partially re-excavated during a period of gradual and uniform upheaval.

But to return to the base of the hill. The Triassic beds, which alone claim attention at present, consist of marl and sandstone. The former is the most prevalent, and possesses all the characters of the same substance west of Budleigh Salterton—the same tendency to break into angular fragments, the same greenish circular patches and discontinuous parallel bands, and the same frequency of small land-slips, owing to the presence of springs. Nevertheless the marl between Sidmouth and the High Peake is distinguishable from that further west by the presence of ovoid hollow geodes beautifully lined on the inner surfaces with crystallized carbonate of lime. Some of them are upwards of a foot in mean diameter; they generally lie with their longest axes parallel to the plane of stratification, and in many cases they coincide with the bedding surfaces. They are not equally abundant in all parts of the cliff, being most numerous, and perhaps largest, about midway between the town and the hill, and decreasing in frequency in a more marked manner towards the east than towards the west.

These beds also contain nodular masses of a greenish or blueish-green matter, which are sometimes more than a foot in diameter, and quite distinct from the greenish circular patches previously mentioned. The latter are true marl, distinguishable from that surrounding them by the difference of colour only; they have the appearance, as has been already stated, of marl from which the prevalent chocolate colour has been discharged, and are no more capable of being extracted from the general mass, in their integrity, than is a rust spot from an otherwise highly-polished steel blade. The nodules just mentioned, on the contrary, are readily separable from the marl beds in which they occur; they differ from the latter in composition also, being rather arenaceous than argillaceous, nevertheless they have not the aspect of incorporated sandstone pebbles. By way of illustration, rather than of explanation or hypothesis, it may be said that they suggest the idea that they are masses of sandy matter segregated from the general material of the beds. White mica is frequently abundant in them, and also in the deposit generally on this part of the coast.

Immediately west of Sidmouth a projecting part of the cliff is composed exclusively of sandstone of the bright brick-red so prevalent about Dawlish. It is separated from the marl, with the duller colour of which it is strongly contrasted, by a line of fracture, possibly of fault, and contains a very fine example of remarkably complex false stratification. This mass is probably a relic of a series of sandstone beds which once occupied the broad vale of Sidmouth; and this idea finds some support in the fact that the Trias, when next it becomes visible, on the eastern bank of the Sid, that is in the direction of the dip of the formation, consists of sandstone and marl, the former prevailing at the base of the cliff, whilst the latter has almost exclusive possession of its summit. Further eastward, in consequence of the inclination of the beds, the section is almost entirely marl, in which light colours are somewhat rare.

At intervals along the cliff, patches of recent gravel, at from two to three feet above the existing beach, are cemented together and to the red rock by carbonate of lime precipitated from water percolating the red beds. From this fact it may be inferred that the beach is subject to considerable changes of level, and that, at probably no great distance in the interior, masses of chalk, invisible from the beach, overlie the Trias, and furnish the cement, which can scarcely be derived from the red rocks, since even the marls contain so very little carbonate of lime as to be without any claim to the name which has been given them.

In progressing towards Salcombe-Mouth something more than a mile from Sidmouth, light colours, greenish bands, and ovoid hollow geodes, all characteristics of the marl immediately west of Sidmouth, are at first rare but gradually become more numerous. Fossil ripple-marks are frequently disclosed. The nearly vertical cliffs are composed of strata which dip no more than about 3° towards E. 10° S., and as the trend of the coast is not quite in this direction, the beds are apparently horizontal. Their *edges* present an appearance, not observed west of the Sid, which did it occur on their *surfaces* would be called *corrugation* and ascribed to lateral pressure; but, as it is impossible that it could have originated in this way, it may be designated "*fluting*." The alternate protuberant and depressed bands are each from two to three inches wide, several feet in length, and they run horizontally along the face of the cliff; hence they are parallel to the stratification. Since several of them sometimes occur vertically over one another in the same stratum, they cannot be due to inequalities in the weathering of alternate beds. Where first observable they are confined to a very limited vertical zone, but further eastward they are of frequent occurrence and extend from the base of the cliff far up towards its summit.

Between Salcombe-Mouth and Weston-Mouth — about one mile—the marl is more mottled than elsewhere east of Sidmouth; it differs, however, from that further west in being traversed by plates of selenite or transparent crystallized gypsum. This substance is first observed immediately east of Salcombe-Mouth, where it occupies a zone of about twenty feet in height, but which rapidly developes into much greater dimensions. Taken in large masses the plates vary much in thickness and are frequently somewhat curved; each of them consists of two laminæ, which were probably formed by the simultaneous deposition of films of sulphate of lime on the opposite walls of a joint, until by continued accretion the interspace was completely filled. The fracture, however, is fibrous, the fibres being perpendicular to the surfaces of the plate. Each lamina is formed of a series of stellate crystalline polygons measuring about two and a half inches by one and a half. The plates resolve themselves into three systems or series, one set being approximately horizontal and the other two sensibly vertical; of the latter, one system takes what may be called an east-and-west, and the other a north-and-south direction. Bifurcations are of somewhat frequent occurrence. If the selenite be supposed to occupy what were previously joints, we must conclude that it was not prepared to take possession of all that were in existence, since it sometimes occurs that the continuity of an open joint is interrupted, but not terminated, by one of the plates. Had such joint been formed subsequently to the deposition of the selenite, the latter, being remarkably brittle, would necessarily have been fractured as well as the marl surrounding it, This substance traverses the cliff from the point just named to Branscombe-Mouth, a distance of four miles. It varies considerably in amount, and is probably most abundant a short distance west of the latter point, where it was formerly worked for commercial purposes. It frequently has the effect of rendering the marl harder and tougher than it is elsewhere.

Small landslips, mainly due to the action of springs, are of frequent occurrence from the Mouth of the Exe to Beer Head. In most cases the waves have access to the fallen matter at every high water, so that it is speedily removed ; but between Weston-Mouth and Branscombe-Mouth (a distance of nearly three miles), there is, at the foot of the cliff, an almost continuous talus, apparently the product of a very large number of such slips, which in some places is cultivated and in others is overgrown with brushwood. Fortunately the Trias attains a greater height than the uppermost line of vegetation, so that here and there it is possible to make observations.

Along this part of the coast, grass, moss, and leaves are very frequently incrusted with carbonate of lime deposited by numerous land-springs, and probably derived from the white chalk which, as outlying masses, is here seen at intervals overlying the Greensand. The most westerly of these outliers, visible from the beach, occurs immediately east of Weston-Mouth.

The fact that the gypsiferous marls occupy cliffs which are crowned with chalk suggests the question, " Did water charged with sulphuric acid, derived perhaps mediately from decomposing vegetable matter, transmute the carbonate of lime of the chalk into sulphate of lime, and thus furnish the material of the veins of selenite ? " Could we reply affirmatively, we should know that the veins are more modern not only than the Trias and even the chalk, but than the elevation of the latter (a deep sea formation) above the sea level. Such a reply, however, would introduce sundry other questions :—First, Why does not selenite occur west of Salcombe-Mouth, since it is certain that chalk once extended as far in that direction as the High Peake, at least ? Second, Did chalk or some other form of carbonate of lime once overlie the widely-spread gypsiferous marls of other parts of Britain? It would be easy, but perhaps scarcely profitable at present, to speculate on these questions. They lie in my path, and hence I call attention to them.

The exceptional colour in the Trias, from Weston-Mouth to its disappearance near Beer Head, is rather blue than green; but the marl itself, like that which forms so large a constituent in the cliff section from Exmouth eastward, may be described, on the whole, as being of a dull chocolate red, and having a tendency to break into small somewhat angular ellipsoids. East of Branscombe-Mouth the Trias occupies a less and less portion of the cliff, and ultimately disappears beneath the cretaceous beds somewhat less than a mile from the valley just named. The termination of the wedge, however, is concealed by a mass of débris.

At the White Cliff, nearly midway between the villages of Beer and Seaton, the red rocks are seen ascending with the overlying cretaceous beds, which conceal them for something more than a mile when measured in a straight line from the point where they plunge below the base of the cliff. The junction of the two formations is distinctly seen at several points; it is well-defined, and apparently, the more modern formation conformably overlies the more ancient, each dipping at about 5° towards S. 56° W. (mag). There does not appear to be any evidence to prove that the disappearance of the Trias west of Beer Head or its re-appearance east of it is due to a fault. It would rather seem that the beds dip eastward in the first case, and westward in the second, towards a synclinal axis; in fact, that they form a trough or basin which the cretaceous strata occupy. Soon after their emergence at White Cliff, they curve over, pass a low, flat, anticlinal axis, recover their wonted gentle easterly inclination, and dip towards Seaton. The Cretaceous beds terminate west of the axis; where they crop out they form the highest ground on the coast between Beer and Seaton.

At Seaton, about three-fourths of a mile eastward, the Trias is again lost, having been cut down by denudation to form the valley into which it dips, and being masked by alluvial matter and the extensive shingle beach which divides the latter from the sea Patches of the Marl *in situ*, however, protrude here and there through the shingle, and a ledge of the same rock forms a sort of rapid near the mouth of the river.

Immediately west of the village the beds are chiefly red and blueish marl containing an appreciable amount of carbonate of lime. Water, oozing through the cliff, deposits this salt on grass and leaves.

The river Axe is jammed close against its eastern or left bank, which rises very abruptly when compared with the long and gentle acclivity of the western bank, from which it is separated by a broad alluvial plain. It may be remarked, in passing, that this description applies strictly also to both the Otter and the Sid.

The Triassic strata east of Axmouth consist of marl; and, on the whole, dip slightly eastward. The inclination never exceeds 5°, and, in consequence of a series of gentle undulations, it is alternately eastward and westward. Red can no longer be considered the prevalent colour, since many of the beds are greenish-drab, whilst others are more or less blue; the latter perhaps being the most prevalent. There is nothing like the mottled or blotched character so common further west; it is here not a red formation in which from some portions of certain layers the colour has been discharged. Nor, when it does occur, is the red so pronounced as it is throughout the entire district from Torbay to the Axe; in fact, so faint is it in many cases that it is impossible not to regard it as a prediction of a coming change—a graduation into the well-known colour of the Lias, the formation immediately succeeding it in chronological order, and which overlies it a very short distance eastward. Different portions of the cliff undergo variations of tint; thus at something less than a mile from Axmouth harbour the section consists almost exclusively of faintly red beds, and this not from the incoming of new strata, but from a change in the colour of those already forming the cliff. On approaching Culverhole Point—a mile and a half from Axmouth harbour—blueish beds alternate with those of drab colour with the occasional intercalation of a faint red or reddish-drab layer. These red beds weather more rapidly than the others, which consequently stand out in relief, and give the stratification greater distinctness than, in the marl, it commonly possesses. What appear to be desiccation cracks are numerous in the blue beds; and some traces of iron pyrites are discoverable in those of greenish hue.

The decidedly liassic aspect of the blue beds stimulates to minute examination, in the hope of discovering the exact line of demarcation between the Trias and the Lias. This line, moreover, ought to be marked and, indeed, defined by the presence of the famous "bone bed;" and as this is well known to be no more, at most, than a few inches in thickness, its detection challenges the most careful scrutiny. It is somewhat tantalizing, therefore, to find that, in consequence of the small angle at which the formation dips, the zone of cliff which holds out the most decided promise is so long in coming down to an accessible level; more especially as the confusion produced by the great landslip of 1839 is so near at hand as to threaten to bury prematurely the entire section under the ruins of fallen rocks. At length, however, immediately west of the spot at which the wild disorder commences, the blue, or rather, blueish black belt is found to have descended to within a few feet of the beach, but, alas! it seems scarcely to differ from bands of similar colour below it, in which no fossils can be seen, and above which there are certainly reddish layers. Judging from the aspect which its weathered edge presents, it is a loose disintegrated stratum of almost black mud. Within it, however, there occurs a hard central plate, varying from half an inch to two inches thick, and readily breaking into small pieces. These, on being very thoroughly washed, disclose the well-known black organic fragments which as certainly define the position of the geologist as do trustworthy observations of latitude and longitude that of the geographer. This plate is, in fact, the "bone-bed;" a breccia composed of animal débris, especially the remains of fish and saurians; and which, in an adjoining county, has yielded the relics of the earliest mammals with which palæontologists are at present acquainted.

Amongst the thoughts which this immediate cliff suggests, three stand out in bold relief. First, the cliff, though by no means very lofty, represents a considerable number of formations. On its *Triassic* base reposes the "bone-bed," which belongs to the *Rhætic* series; and this is succeeded by the *Lower Lias*. Still higher we meet the *Greensand* (probably of *Gault* age) and *Chalk*—two members of the *Upper Cretaceous* system. Lastly the cliff is crowned with *Gravel*, filling "pipes" and inverted conical spaces in the chalk, and probably of Quaternary age. Secondly, unusually varied and eventful as is the history recorded here, the cliff also shows how very imperfect, in even the richest locality, is the geological record. The hiatuses are numerous and wide. The *Middle* and *Upper Lias*, the *Oolite* with its numerous and important divisions and sub-divisions, the *Neocomian* or *Lower Cretaceous* system, the *Eocene*, the *Miocene*, and the *Lower* and *Upper Pliocene* formations are entirely wanting. Thirdly, whilst each step from Torbay to the mouth of the Axe has brought under inspection newer and still newer beds, not one of them has yielded a fragment of any contemporary organism. Even when the strata had begun slowly and gradually to put on new colours, they remained to the last entirely silent respecting the life-history of their era. Suddenly, however, and as if by a vast leap, we are in the presence, not of a mere mausoleum, not of a rock simply *containing* fossils, but of a stratum almost entirely *composed* of them. A bed spreading over large areas, characteristically thin everywhere, and yet so extremely rich in organic remains that one geologist states that, though he rejected all but the most perfect examples, he detected in three cubic yards of the materials of which it consists no fewer than forty-five thousand fish teeth belonging to two species of the genus *Acrodus,* to say nothing of numerous remains of several other genera of fish, eight or nine genera of reptiles, and twenty-five teeth and vertebræ belonging to three or four genera of mammalia.*

Culverhole Point is the western termination of the famous landslip already alluded to; and thence, for about a mile and a half eastward, the cliff is completely occupied with fallen Cretaceous matter. There can be no doubt, however, that the dip of the Trias must have carried it below the section before it reached the disturbed region. Rocks *in situ* are again visible at Charton Bay, where the lower part of the cliff consists of a fine series of drab, blue, and blushing Triassic marls, with rather large nodular masses of selenite; and the upper of fossiliferous Lias. Unfortunately the refuse thrown out from the quarries which have been worked in the Lias, completely conceals the junction of the two formations, but there is little doubt of a true mineral and stratigraphical passage or graduation of one into the other. At the western end of this section the strata dip at about 3° towards N. 54 W. (Mag.); this inclination, gradually diminishing, becomes reversed near the centre of the bay, and towards its eastern end is 3° in the direction S. 18° E.

Sir Henry De La Beche, in his Report, which was published in 1839, and, therefore written before the occurrence of the great land slip at the end of that year, says that in Charton Bay "the upper variegated beds are brought in for a short distance by a fault."† This is probably the fact, but it is impossible to determine the point at present, so completely is the section concealed by the fallen matter. Be this as it may, the Triassic formation is finally lost sight of near the Humble Rocks, about two miles within the Devonshire border.

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* C. Moore, F.G.S., in Report of Brit. Assoc., page 88, (1860).

† "Report on Geology of Cornwall, &c.," page 209, (1839).

We are now in a position to look once more at the question of the Age of the formation. That it is Triassic there can be no doubt, for to this extent the question was finally disposed of by the granite fragments found on Haldon, and described and discussed in my first paper.* The facts adduced in my second paper,† taken with those now brought forward, go to show that the Red rocks of Devonshire belong to *one* of the three Triassic divisions. It is true that marl is the exception south of the Exe, and that Conglomerates are comparatively not prevalent north of it; but it is also true that marl occurs even near the base of the formation, as, for example, in the north cliff of Goodrington Sands, Torbay; and that, to say nothing of the "Pebble Bed," Conglomerate occupies a large part of the section between the Otter and the Sid. Again, it is true that, taken as a whole, the dip of the beds beyond the Exe differs considerably, both in amount and in direction, from that of the strata south of that river; but it is equally true that in both respects the change is so gradual that a line of separation cannot be found or laid down. It must be admitted, however, that the southern beds have, on the whole, the features of the Bunter or Lower Trias, rather than of any other part of the system; whilst those on the north shew a decided likeness to the Keuper or Upper Trias. Indeed, were it not that it would be very heterodox to hint that Britain anywhere contains an equivalent of the Muschelkalk, or Middle Trias, it would be the easiest way out of the difficulty to suppose that all three divisions are represented in our red cliffs; and it may be confessed that the vast dimensions of our deposits would give some support to such a guess could it be shown to be even but slightly probable. But declining, as we must, to listen to such a seductive heresy, we are under the necessity of supposing that *one* division alone is represented, or that we have the two extremes but not the intermediate division. To accept the latter view is to accept the following suppositions:—

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* "Transactions," 1861-2. † Ibid. 1862-3.

1. During the period of the Bunter, south-eastern Devonshire was below the sea level, and the lower Red rocks of that district were deposited under conditions to which their remarkable colour is ascribable.

2. At the close of this period, the district, in common with the whole of the British Archipelago, was raised above the sea level.

3. Throughout the vast interval represented by the Muschelkalk of Germany no part of the British area was capable of receiving a deposit.

4. At the close of the Middle Trias, South-eastern Devonshire was restored to its former level and the deposition of rocks was resumed; when the conditions were so very similar that both in their colour and in their petralogy the new strata so strictly conformed to the old ones as to render it impossible to detect or to draw a line of demarcation between them.

To me it appears to be more simple and probable that the Red rocks of the south east of this county were deposited without any such great interruption, that they form *one*, not *two*, of the divisions of the Trias; and, if so, there can be little doubt as to which group it is. There is towards the eastern end of the section so gradual an exchange of the red colour for greenish and blueish drabs, in short such a quiet inosculation of the features of the Trias with those of the Lias, and in Charton Bay, as well as west of Culverhole Point, the parallelism of the Liassic beds above and the Triassic beds below is so obvious, that, though, as has been stated, the precise junction of the two formations cannot in the former district, be exactly seen, it is impossible to doubt that the marl beds are the uppermost strata of the Keuper; and to this age, in the present state of the evidence, I would refer the entire deposit from Torbay to the eastern confines of our county.

I have dwelt at some length on this question because in my second paper the formation south of the Straight Point was supposed to belong to the Bunter, and I avail myself of this opportunity to explain how that conclusion was arrived at. Hitherto opinions have been divided as to whether the Red rocks south of the Exe are Permian or Lower Trias; the latter has been the prevalent idea, and the rocks are coloured in accordance with it in the Maps of the Geological Survey. I endeavoured in the paper just mentioned* to prove that they are not Permian, and unquestioningly accepted the other alternative. My second paper contains what still appears to be good evidence that the rocks on the opposite sides of the estuary of the Exe belong to one and the same series†; and, consistently with the premises, it was inferred that the whole are of the age of the Bunter. I was not then acquainted with the antagonistic facts presented by the rocks in the extreme east of the section. The present position of the argument is as follows:—

1. The rocks in the southern part of the section cannot be older, but there is nothing to show that they are not more modern, than the Bunter.

2. Their colours and petralogy show that they form one uninterrupted series with those in the eastern part of the area; and the lithology of the two is not incompatible with this.

3. The eastern beds unquestionably belong to the age of the Keuper; to which therefore the entire series must be referred.

To those who accept the premises, the inference which I have drawn must be inevitable.

On looking back from Charton Bay along the forty miles of Triassic coast, it is impossible not to reflect on the enormous volume of the formation, and the vast period of time which it represents.

Assuming that when deposited all strata were horizontal, and that no important faults occur amongst them, it is obvious that the thickness of a series of inclined beds will be obtained by multiplying the sine of their angle of inclination by their horizontal extension in the direction in which they dip. For let (in Fig. 1)

* "Transactions," 1861-2, pages 27-29.

† "Transactions," 1862-3, pages 35, 36.

A B C D be a series of parallel beds dipping towards B at the angle A B D, and forming a cliff section on a coast the trend of which coincides with the direction of the inclination of the beds, and which is represented by the plane of the paper. From A draw A D perpendicular to B D. It is obvious that the thickness of each bed is measured by that portion of the line A D which traverses it, and that therefore the total thickness of the section is the line A D, which, since A D B is a right-angled triangle, is equal to A B × sine ∠ B. Thus if A B is 4 miles and the angle B contains 30°, then, since the sine of 30° = ½, the thickness of the beds = 4 miles × ½ = 2 miles.

It was shown in my second paper * that from Goodrington Sands, Torbay, to the Straight Point, the mean dip of the formation is 15° 30′ towards N. 44° 30′ E. (true), or in the direction of the latter from the former point; and that, measured in a straight line the distance is fifteen miles; so that, calculated in the manner just explained and with the assumptions previously mentioned, the thickness of this part of the formation would amount to fully four miles.

The amounts and directions of the dips from the Straight Point to Charton Bay is shown in the following table :—

LOCALITIES.	DIPS.	
	AMOUNTS.	DIRECTIONS.
Between Straight Point and Budleigh Salterton	9°	N. 66° E. (mag.)
,, Budleigh Salterton and the Otter ..	5°	,, 43° ,, ,,
,, The Otter and Ladrum Bay	7°	,, 37° ,, ,,
,, Ladrum Bay and Sidmouth	7°	,, 180° ,, ,,
,, Sidmouth and Weston Mouth	3°	,, 125° ,, ,,
,, Weston Mouth and Beer Head	6°	,, 128° ,, ,,
,, The Axe and Charton Bay	2°	,, 120° ,, ,,
Means	5½°	,, 100° ,, ,,

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* "Transactions," 1862-3, page 30.

Each of the foregoing entries is the mean of several observations, and, for facility of comparison, the directions are all entered in degrees from the north towards or through east. When corrected for magnetic declination, the entire series give an average dip of 5½° towards N. 76½° E.

Measured in a direct line, the distance and bearing of Charton Bay from the Straight Point are respectively 16·5 miles and N 69° E. Hence, since the general trend of the coast differs from the direction of the dip, the calculation is not quite so elementary as in the foregoing case, nevertheless it presents no difficulty. For let N S (Fig. 2) be a north-and-south line, S the Straight Point, C Charton Bay, and S B the direction in which the strata dip. Join S C, and from C draw C B perpendicular to S B, then C B represents the strike of the formation, S B its horizontal extension in the direction of the dip, and S C the general line of the coast. Then, since S C has a bearing of N 69° E, and S B of N 76½° E, the angle B S C, which they contain, is 7½° (=76½—69); and, as B is a right angle, S B = S C × cos. ∠ B S C = 16·5 miles × cos. 7½° = 16·3 miles; a result so very near the length of the coast line that the calculation might have been omitted without entailing appreciable error. It appears then that the beds between the Straight Point and Charton are equivalent to a section 16·3 miles in length, and composed of strata dipping at an angle of 5½° in the direction of the section: data which, for this part of the formation, give a thickness of fully 1·5 mile. If to this we add the calculated thickness (4 miles) of the rocks from the Straight Point southwards, we obtain a total of 5·5 miles for the entire formation as developed in our south-eastern cliffs.

It is not improbable that the following objections may be made here:

1. That deductions should have been made for the important breaks which occur in the continuity of the formation.

2. That, possibly, faults of considerable magnitude may exist, for which deductions should also be made.

3. That the strata were, perhaps, never horizontal.

The interruptions or breaks of continuity are three: namely, between Torbay and Babbicombe bay; from the eastern extremity of Branscombe beach to the western end of Seaton beach; and from Culverhole Point to the western termination of Charton Bay.

I believe it to be capable of proof that deductions need not, and indeed should not be made on account of either of the first two breaks; but waiving this point, and confining the calculation to the continuous succession of beds extending from Petitor, north of Babbicombe, to Beer Head, thus entirely omitting the beds in Torbay as well as those east of Beer, it will be found that the result falls but little below that already obtained. It must be borne in mind that the calculated thickness is a product of which one factor is the extent of the deposit in the direction of its inclination, and the other the sine of the angle at which the strata dip. Now by omitting the disturbed districts and the strata beyond them, the first factor will be diminished but the second will be increased; for in both the rejected areas the dips are smaller than they are elsewhere, and hence the means will be augmented by their withdrawal. Dividing the section into two parts, one from Exmouth southward, and the other eastward from the same place, the calculated thickness is 2·9 miles and 1·6 miles respectively, a total of 4·5 instead of 4·8, previously obtained.*

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* The following are the data (corrected for magnetic declination) from which this result is obtained :—

	Distances	Bearings.	Mean Dips.		Angles between Dip Direction and Bearing of Coast.
			Amounts.	Directions.	
From Petitor to Exmouth	9·6 miles	N. 27° E.	18°	N. 40° E.	13°
„ Exmouth to Beer Head	14 „	N. 72½° E.	6½°	N. 77½° E.	5°

Hence we have total thickness of strata $= 9{\cdot}6$ miles $\times$ cos. $13^\circ \times$ sin. 18° $+ 14$ miles $\times$ cos. $5^\circ \times$ sin. $6\frac{1}{2}^\circ = 2{\cdot}9 + 1{\cdot}6 = 4{\cdot}5$.

But to proceed to the second objection. Faults are undoubtedly numerous throughout the district; but almost all of them are of very limited extent. Moreover, the effect of a fault may be either to enhance or to depreciate the apparent thickness of a series of strata; the required correction is not necessarily subtractive. If the beds are *let down* in the direction towards which they dip, the apparent thickness will be less than the real; but if they are *raised* in this direction, the effect is reversed. Let figure 3 represent a cliff section composed of a series of inclined beds which have been so faulted at C that the strata on the right or dip side of the fault are lower than on the opposite side; and, for the sake of simplicity, let it be supposed that the fault is vertical and that it has made no change in the amount or direction of the dip. It is obvious that since the beds 5, 6, 7 do not occur at the base of the section, the measured horizontal extension, and therefore also the calculated thickness of the formation, will be less than the truth. Next, let the Section represented in Fig. 4 differ from the preceding only in having the beds *raised* on the dip side of the fault; here it is seen that the beds 1, 2, 3, 4 occur twice at the base; hence the measured length of the section and its calculated thickness will be greater than the truth. In general terms, therefore, the calculated thickness of a series of faulted strata will be greater or less than the real thickness, according as the beds are higher or lower on the dip side of the fault, than they are on the opposite side.

We have now therefore two questions before us: 1st. What is the character of the faults which are known to exist in the red rocks of south-eastern Devonshire? 2nd. Is it probable that the formation contains important undetected faults such as would cause its calculated thickness to be much above the truth?

So far as I have observed, the faults in Torbay, as well as between the Straight Point and Ladrum bay, raise the beds on the dip side; on the other hand, those between Dawlish and the Exe, and between Sidmouth and Culverhole Point lower them. From their small dimensions their total effect in each set must be inconsiderable, and probably the one will go far to neutralize the other.

The following considerations render it eminently improbable that the formation is traversed by any important undetected faults of the kind supposed. Were the strata perfectly homogeneous throughout the entire section it would be difficult, perhaps impossible, in the absence of fossils, to show that, at least, some of the numerous valleys do not occupy great fault lines which have again and again brought into the section beds which otherwise would have disappeared. But with strata so dissimilar as conglomerates, sandstones, and marls, and with these subdivided into very distinct and easily recognized groups, it would be easy to detect a fault of much value, or rather it would be difficult not to detect it. Now nothing appears more certain, with the exception perhaps of those immediately east and west of Beer, and those also on the opposite sides of the landslip, than that those beds have disappeared for ever which have once dipped below the beach or sea level. It is true that there are conglomerates from the Exe southwards, between the Straight Point and Budleigh Salterton, and between the Otter and Ladrum bay ; but it is impossible to mistake any one of these series for either of the others. For example, the second of these—the " Pebble Bed "—is not a faulted portion of the conglomerates which prevail between Exmouth and Torbay. We have seen that it is formed of materials of a totally different character, much more distant derivation, and accumulated under very dissimilar conditions. Nor is it repeated in the conglomerates east of it: and the latter, in like manner, are incapable of being confounded with those south of the Exe. Again, Marls prevail between Exmouth and the " Pebble Bed," and from Ladrum bay to the termination of the formation in Charton bay, but in different areas they have very distinct characters. Between Ladrum bay and Sidmouth they contain ovoid geodes lined with crystals of carbonate of lime; from

Weston Mouth to Beer Head they are gypsiferous; and from the Axe eastward, variegated; west of Budleigh Salterton they have neither geodes, nor gypsum, nor interstratified beds of light colour. Sandstones, again, are frequently repeated; but it is in the Budleigh Salterton district only that the botryoidal and other grotesque concretions are developed by weathering. Between Exmouth and the Straight Point they possess colour phenomena distinguishing them from the arenaceous beds elsewhere; nor would it be easy to mistake the variegated beds of Torbay for those of any other portion of the series. In fine, by passing from Torbay to Charton bay we uninterruptedly ascend, bed by bed, from more ancient to more modern times.

It now remains to consider, very briefly, whether there may not be exceptions to the dogma that all strata were originally horizontal. There can be little doubt that the principle is perfectly sound and trustworthy in almost every instance; nevertheless there are cases in which successive layers of detrital matter are thrown down so as to form a comparatively steep talus. Sir Charles Lyell states, that "at the base of the Maritime Alps near Nice, a vast succession of slanting beds of gravel and sand may be traced from the sea to Monte Calvo, a distance of no less than nine miles in a straight line. The dip of these beds is remarkably uniform, being always southward or towards the Mediterranean, at an angle of 25°." * Calculated on the foregoing data, and in the manner previously explained, the thickness of these beds would be about 3·8 miles; but, according to the author just quoted, "the vertical depth of gravel and sand in any one place cannot be proved to amount even to 1000 feet, although it may perhaps be much greater, yet probably never exceeding at any one point 3000 or 4000 feet." Possibly something of this kind may have occurred in the formation of the Devonshire Trias, nevertheless I am not aware of a single fact on which to base such an hypothesis. But be this as it may, the facts which have been already adduced

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* "Elements of Geology," 6th ed., page 18, (1865).

require us to ascribe an enormous thickness to the Red Rocks of our county, though we must hesitate to claim for them the results of the calculation based on the data which they furnish.

It must not be forgotten, moreover, that we now see but a remnant of the formation. Outliers and other phenomena indicate that it formerly covered a much greater area; and when we observe how deep are the valleys which denudation has formed in it, we cannot doubt that the hills which bound them have lost very much of their altitude. Enormous as is its volume now, it is but a fraction of what it once was.

Since it is known that in 1783 the Volcano of Skaptar Yokul, in Iceland, poured forth such floods of lava that "one of the streams was fifty miles long and fifteen wide in some places; and another forty miles long with an occasional width of seven miles; each of them having an average depth of 100 feet, increasing here and there to 500 or 600,"* it becomes necessary to keep in view the *origin*, as well as the *volume*, of a formation when speculating on its chronological value. Now every cubic inch of the rocks we have been considering is of mechanical origin. No one, however slender his geological information, can contemplate a bed of ordinary conglomerate without a conviction that it is a consequence and a proof of the destruction of at least an equal amount of pre-existent rock. Each pebble it contains is evidence of the successive processes of denudation, attrition, transportation, and deposition. It is not certain that a piece of fine sandstone so readily impresses the unscientific observer; nevertheless, the only difference between the two rocks is merely that of between coarse and fine. The particles composing the sandstone must have experienced the same mutations as the pebbles forming the conglomerates; but with this difference: in the former, the grinding down of the fragments of the parent rock was completed, in the latter it was but begun; in the one case the entire mass was reduced to fine sand, in the other only the angularities were removed. All other things being the same, the time-value of a rock of detrital origin is a direct function of the fineness of the grains composing it.

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* Jukes' "School Manual of Geology," page 16, (1863).

Deposition cannot, on the whole, go on more rapidly than the denudation and trituration which necessarily precede it; and when, with this fact prominently in view, we attempt to reduce to centuries the cubic miles of the Devonshire Trias, it is impossible to escape from the conclusion, that this fragment of one division of a single and comparatively unimportant unit in the chronological scale of the geologist, is worth vastly more than the few milleniums within which our fathers believed the age of our planet to be comprised.

It is of no avail, nor is it a reply, to say that we are not possessed of a modulus by which to compare astronomical with geological revolutions. It is not at present, it perhaps never will be, in our power to say how many rotations on her axis, or how many revolutions round the sun were completed by our world, or, to take a much larger unit, how many times the pole of the equator passed through its circuit round the pole of the ecliptic, during the deposition of a bed of sandstone. Nor is it in our power to resist the conviction that the antiquity of the earth is vast beyond human comprehension.

Nor will it more avail to invoke the aid of Convulsion—that forlorn hope of an age now hastening to extinction. The rocks under our notice are not only without indications of paroxysm, but they contain evidence that during their era events succeeded one another as tranquilly as at present. The rain-drop impressions in the marly sandstones tell us that then, as now, there were gentle showers, and the desiccation cracks indicate the sweet shining of the sun after the shower; the ripple-marks—obviously not such as can be ascribed to ocean currents in deep water—show us how gentle were the Triassic wavelets, and how carefully the returning tide preserved the inscriptions of its immediate predecessor. These indications of a tidal strand are capable of giving us still further information. They are found in every part of the area and at all levels in the formation—at the base of the sea-cliff and at hundreds of feet vertically above it. Each bed was formed on a shore which the tide daily covered and left dry; a fact to be explained only on the hypothesis that the area of sedimentation was one of subsidence also. Slowly and gradually as the structure was reared, at least as slowly and gradually did the foundation sink. And this information is afforded not only by the sandstones but by the conglomerates also. They are formed of materials which are entirely unsorted; coarse and fine being thrown down together, yet not without order; for the accumulation is distinctly stratified, and the unequiaxed stones lie with their longest axes in the plane of the bedding. This portion of the formation is precisely such as the waves now form on an *open* beach, and this is true of each bed in the enormous pile. Like the sandstones, each stratum represents a new relative level of land and sea; a fact not only in harmony with, but calculated to enhance the chronological estimate we have already formed.

Though, as we have seen, there were no interruptions in the process of deposition sufficiently important to warrant the opinion that our Red rocks represent more than one of the divisions of the Triassic system, there were periods, not of intermittence merely, but of unbuilding; periods which, though comparatively brief, must have been of considerable duration when measured by human standards. Thus, it not unfrequently happens that fragments of Triassic sandstone form part of the materials of which a bed of Triassic conglomerate is composed. The following fact places this curious and important point beyond the reach of doubt. A nodule which I found in the conglomerates of Torbay is unmistakably a portion of one of the variegated beds so characteristic of the Torbay sandstone; it is evidence of a suspension of deposition, of unbuilding during the pause, and that certain of the variegated sandstones had become so coherent as to be capable of furnishing fragments which could endure the rolling action of the waves and yet preserve all the characteristics of the bed whence they were derived. Moreover, as both the conglomerates and the sandstones of Torbay belong to quite the base of the formation as developed in Devonshire—the former being, so to speak, scarcely a step above the latter,—we are under the necessity of believing either that the process of formation was so extremely slow that a bed of sand was converted into indurated sandstone before the conglomerate, almost immediately over it, was formed ; or that the sandstone was formerly overlain by a thick series of beds of which every trace was torn down before the deposition of the conglomerate. There does not appear to be any other alternative ; but, whichever view we adopt it cannot but enhance our notion of the time-value of the formation.

Nor are these nodules the only evidence of intercalated periods of unbuilding. Some of the cliff sections are found to consist of two series, one of which is composed of course materials, the other of fine. That, however, which resolves them into two distinct sets of Triassic deposits, is the fact that the upper surface of the lower group has been cut into a series of steps, which, to use the terminology of architects, are irregular in their *rise* and in their *tread.* They are formed of the truncated ends of a series of partially and unequally denuded beds, and into these inequalities the lower beds of the upper series are dovetailed. A fine example of this kind exists in a low headland immediately south of Paignton harbour, and necessitates the belief that during a pause in sedimentation, the upper beds of the lower series were partially destroyed, after which the overlying beds were deposited under somewhat different conditions, as is evidenced by the dissimilar characters of the two groups. It is worthy of remark that the dip of the upper beds is precisely the same, in amount and in direction, as that of the lower ; hence, had the denuded strata been completely, instead of partially, destroyed there would have been the most exact conformability between the two series, and not a trace of evidence that there had been any denudation at all ; a fact which suggests the possibility that the destruction is only partially represented by the fragmentary beds which remain. It may be observed also that, for anything which appears to the contrary, the intercalated period of unbuilding may have been immediately preceded and succeeded by intervals of quiescence, intervals which in each case separated those of the reversed activities.

Facts connected with diagonal stratification, so frequently and so beautifully displayed in the sandstones and finer conglomerates, teach the same truth.* They, like those just dismissed, are indeed inexplicable except on the hypothesis that the period represented by our Red rocks was one, not of uninterrupted sedimentation, but in which the processes of rearing were frequently intermitted and occasionally exchanged for those of razing. Its duration is not measured by the volume of the rocks deposited within it, nor by the time necessary for the pre-requisite denudation; if we even estimate at its full value the minute trituration which in very many cases the materials have undergone, we still fall short of the truth, for each and all of these omit the large item of re-denudation, which was again and again repeated.

I have purposely abstained from introducing the question of the prevalent jointage of the Trias; the subject is too large to be discussed in the present paper; and its relations and ramifications are so numerous and so various, as to suggest that it should be undertaken by some one prepared to produce a general monograph on "The Divisional planes of the Rocks of Devonshire and Cornwall."

In conclusion, I beg to thank you Mr. President, and, through you, the Council of the Institution, for having allowed me a third time to bring the Red Rocks of our county under discussion; and I desire also to express my appreciation of the kind way in which my papers have been received by the members who have done me the honor to be present.

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* See "Transactions of the Devonshire Association for the Advancement of Science, Literature, and Art," 1863, page 37, &c.

A

CATALOGUE

OF THE

LEPIDOPTERA OF DEVON AND CORNWALL.

Part III.

BY J. J. READING, M.E.S.

The Council of the Plymouth Institution and Devon and Cornwall Natural History Society being desirous to embody, in the Annual Reports, a Catalogue of the Fauna and Flora of the two counties, the following is a third instalment of the Lepidoptera. The Rhopalocera, and the first and second groups of the Heterocera (the *Sphingina* and *Bombycina*) have already been catalogued.

The insects treated of in the following pages comprise the whole of the species of the group *Noctuina* that are known as natives of Devon and Cornwall.

This third portion of the Catalogue has been prepared mainly from the original notes and observations of the writer, who has been assisted (with respect to distant habitats) by reliable correspondents ; printed books having been referred to only when other authority was wanting.

The arrangement adopted is that of Stainton's "Manual of British Butterflies and Moths,"—selected in consequence of its being not only the latest complete work on the British Lepidoptera, but also the most accessible.

When initials are appended, the writer is indebted to his correspondents, to whom he takes this opportunity of returning his warmest acknowledgments.

The following contributors' names are abbreviated in the Catalogue, as in the subjoined list :—

Dr. Battersby, Torquay	*Dr. B.*
Dr. Cocks, Falmouth (contributions towards a Fauna of Falmouth)	*Faun. Fal.*
Mr. J. S. Dell, Devonport	*J. S. D.*
Mr. H. Dorville, Alphington	*H. D.*
Dr. Jordan, Teignmouth	*Dr. J.*
Mr. G. F. Mathew, F.L.S., Barnstaple	*G. F. M.*
Mr. E. Parfitt, M.E.S., Exeter	*E. P.*
Mr. R. B. Reed, 12th Regt.....	*R. B. R.*

London, *October*, 1865.

A CATALOGUE

OF THE

LEPIDOPTERA OF DEVON AND CORNWALL.

By J. J. READING, M.E.S.

Order—LEPIDOPTERA, *Lin.*

Section II.—HETEROCERA, *Bois.*

Group III.—NOCTUINA, *Staint.*

Sub-Group—TRIFIDÆ, *Gn.*

Sub-Section—BOMBYCIFORMES, *Gn.*

Family—NOCTUO-BOMBICIDÆ, *Gn.*

Gen. **THYATIRA,** *Och.*

149. **T. derasa,** *Lin.*

Pha-Noctua derasa, Lin. Sys. Nat. ii. 851.
Thyatira derasa, West. & Hum. Brit. Moth. i. 201, pl. 41, fig. 13.—Staint. Man. i. 173.

Not uncommon in the neighbourhood of Plymouth, occurring annually. It is common in North Devon.

App.—July.

Loc.—Plymouth; Ivybridge; Kingsbridge; Bovisand; Millbrook; Truro;—Barnstaple, *G. F. M.;* Exeter, *E. P.;* Torquay, *Dr. B.;* Teignmouth, *D. J.*

150. **T. Batis,** *Lin.*

Pha-Noctua batis, Lin. Sys. Nat. ii. 836.
Thyatira batis, West. & Hum. Brit. Moth. pl. 41.—Staint. Man. i. 174.

Not so common as the preceding species in the Plymouth district, but equally so in the North of Devon, where it is captured freely at "sugar."

App.—June and July.

Loc.—Woods, Plymbridge; Ivybridge; Yealmpton; Fancy; Liskeard; Truro;—Barnstaple, *G. F. M.*; Exeter, *E. P.*; Torquay, *Dr. B.* & *R. B. R.*; Teignmouth, *Dr. J.*

Gen. **CYMATOPHORA,** *Treit.*

151. **C. duplaris,** *Lin.*

Pha-Pyralis duplaris, Lin. Sys. Nat. ii. 883.
Ceratopacha duplaris, Steph. Illust. Haust. iii. 52.
Cymatophora duplaris, Staint. Man. i. 174.

Not unfrequent during some seasons, but usually rare.

App.—July.

Loc.—Bickleigh-Vale; Yealmpton;—Barnstaple, *G. F. M.*; Torquay, *Dr. B.*; Exeter, *E. P.*; Dunsford Wood, *H. D.*; Teignmouth, *Dr. J.*

152. **C. diluta,** *Schiff.*

Noctua diluta, Schiff. Wien. Verz. 87.
Ceropacha diluta, West. & Hum. Brit. Moth.
Cymatophora diluta, Staint. Man. i. 175.

Not generally distributed, but common in some neighbourhoods, particularly in the North of Devon.

App.—August.

Loc.—Yealmpton; Kingsbridge; Shaugh Bridge; Totnes;—Barnstaple, *G. F. M.*; Millbrook, *J. S. D.*; Dunsford Wood, *H. D.*

153. **C. flavicornis,** *Lin.*

Pha-Noctua flavicornis, Lin. Faun. Suec. 1204.—Sys. Nat. ii. 856.
Ceratopacha flavicornis, West. & Hum. Brit. Moth. i. 203, pl. 43, fig. 7-8.
Cymatophora flavicornis, Staint. Man. i. 174.

Not an uncommon moth in some districts of England, but appears rare in the area now under notice. It has fallen under the observation of Mr. Dorville, at Fordlands, near Exeter; and it has been taken at Wembury, near Plymouth; these places being the only localities at present recorded as habitats for this species, in the two counties.

154. **C. ridens,** *Fab.*

Noctua ridens, Fab. Mant. ii. 180.
Ceropacha ridens, West. & Hum. Brit. Moth. i. 205, pl. 43, fig. 9-10.
Cymatophora ridens, Staint. Man. i. 176.

A rare insect.

App.—May and June.

Loc.—Riverside, Plymbridge;—Exeter, *E. P.;* Great Torrington, Ent. Int. p. 36, 1856; Stokewood, *Rev. Mr. Hellins.*

The *larvæ* are obtainable from oaks during August and September. They have the peculiar propensity of eating not only other species of *larvæ*, but of devouring their own kind. These cannibal caterpillars should therefore be kept apart while trying to rear the *imago*.

FAMILY—BRYOPHILIDÆ, *Gn.*

Gen. **BRYOPHILA,** *Treit.*

155. **B. perla,** *Schiff.*

Noctua perla, Schiff. Wien. Verz. 70.
Bryophila perla, West. & Hum. Brit. Moth. i. 199, pl. 41, fig. 10.—Staint. Man. i. 177.

It occurs in localities north, east, and west of Plymouth, but has only once been detected in that district. At Torquay and Barnstaple it is common, and in the region of Falmouth not scarce.

App.—July.

Loc.—Torquay, *R. B. R.; Dr. B.;* Exeter, *E. P.;* Barnstaple, *G. F. M.;* Falmouth, *Faun. Fal.;* Plympton, *J. S. D.;* Teignmouth, *Dr. J.*

156. **B. glandifera,** *Schiff.*

Noctua glandifera, Schiff. Wien. Verz. 70.
Bryophila glandifera, West. & Hum. Brit. Moth. i. 199, pl. 41, fig. 8.—Staint. Man. i. 177.

Very common at Plymouth and Barnstaple on walls and rocks.

App.—July and August.

Loc.—Hoe, Cattedown, Laira, Mutley, Plymouth; Devil's-point and Admiral's-hard, Stonehouse; Morice-town, Park-wall, Devonport;—Exeter, *E. P.;* Torquay, *R. B. R.;* Barnstaple, *G. F. M.;* Falmouth, *Faun. Fal.;* Teignmouth, *Dr. J.*

FAMILY—BOMBYCOIDÆ, *Gn.*

Gen. **DIPHTHERA,** *Och.*

157. **D. Orion,** *Esp.*

Noctua Orion, Esp. Schmett. Europ.
Diphthera Orion, West. & Hum. Brit. Moth.
Diphthera Orion, Staint. Man. i. 179.

Only three specimens of this beautiful insect have been taken within the limits assigned to our local *Fauna.*

App.—June.

Loc.—Wembury;—Great Torrington, *G. F. M.;* West Looe, *E. Horton*, Ent. Int. p. 108, 1856.

Gen. **ACRONYCTA,** *Och.*

158. **A. tridens,** *Schiff.*

Noctua tridens, Schiff. Wien. Verz. 67.
Acronycta tridens, West. & Hum. Brit. Moth. i. 198, pl. 42, fig. 7.—Staint. Man. i. 180.

The perfect insect is rare, but in the larval state more frequently met with. Bred by Mr. Dell from *larvæ* found on Blackthorn.

App.—June.

Loc.—Gardens, Plymouth; Barnstaple, *G. F. M.;* Exeter, *E. P.*

159. **A. Psi,** *Lin.*

Pha-Noctua Psi, Lin. Sys. Nat. ii. 846.
Acronycta Psi, West. & Hum. Brit. Moth. i. 198, pl. 42, fig. 5.—Staint. Man. i. 181.

One of our commonest moths, occurring in nearly every place throughout Devon and Cornwall.

160. **A leporina,** *Lin.*

Pha-Noctua leporina, Lin. Sys. Nat. ii. 838.
Apatela leporina, West. & Hum. Brit. Moth. i. 193, pl. 41, fig. 1.
Acronycta leporina, Staint. Man. i. 181.

Not uncommon around Plymouth. The caterpillar is found on the black Poplar.

App.—June and July.

Loc.—Greenbank, North-hill, Ham Street, Plymouth, and Nurseries, Stoke; Milehouse, Devonport;—Torquay, *Dr. B.;* Barnstaple, *G. F. M.;* Teignmouth, *Dr. J.*

161. **A. Aceris,** *Lin.*

Pha-Noctua Aceris, Lin. Sys. Nat. ii. 846.
Apatela Aceris, West. & Hum. Brit. Moth.
Acronycta Aceris, Staint. Man. i. 181.

Rare and local.

App.—May and June.

Loc.—Saltram Woods; Mount Edgcumbe;—Torquay, *Dr. B.;* Saltash, *J. S. D.*

162. **A. megacephala,** *Schiff.*

Noctua megacephala, Schiff. Wien. Verz. 67.
Acronycta megacephala, West. & Hum. Brit. Moth. i. 195, pl. 42, fig. 16.—Staint. Man. i. 181.

Frequently. "Common especially in the *larva* state."—*G. F. M.*

App.—June and July.

Loc.—Plymouth; Whitsand-heights; Wembury;—Torquay, *Dr. B.;* Barnstaple, *G. F. M.*

163. **A. Alni,** *Lin.*

Pha-Noctua Alni, Lin. Sys. Nat. ii. 845.
Acronycta Alni, West. & Hum. Brit. Moth. i. 195, pl. 42, fig. 3.—Staint. Man. i. 182.

Very rare.

App.—June.

Loc.—Plymouth, *R. B. R.;* Barnstaple, *G. F. M.;* Tavistock, *R. Mac Lachlan, (larva)*, September 8th, 1862.

164. **A. Ligustri,** *Schiff.*

Noctua Ligustri, Schiff. Wien. Verz. 70.
Acronycta Ligustri, West. & Hum. Brit. Moth.

Not uncommon generally. Common at Barnstaple.

App.—July.

Loc.—Plymouth; Devonport: Knackersknowle; Anthony; Liskeard;—Torquay, *Dr. B.;* Exeter, *E. P.:* Barnstaple, *G. F. M.;* Teignmouth, *Dr. J.*

165. **A. Rumicis,** *Lin.*

Pha-Noctua Rumicis, Lin. Sys. Nat. ii. 852.
Acronycta Rumicis, West & Hum. Brit. Moth. i. 197, pl. 42, fig. 15.—Staint. Man. i. 182.

Common everywhere.

SUB-SECTION.—GENUINÆ, *Gn.*

FAMILY.—LEUCANIDÆ.

Gen. **LUCANIA,** *Och.*

166. **L. conigera,** *Schiff.*

Noctua conigera, Schiff. Wien. Verz. 84.
Mythimna conigera, West. & Hum. Brit. Moth. i. 142, pl. 29, fig. 3-4.
Leucania conigera, Staint. Man. i. 187.

Local, but abundant.

App.—July.

Loc.—Whitsand-cliffs; Jenny-cliff; Bigbury;—Torquay, *R. B. R.;* Barnstaple, *G. F. M.;* Exeter, *E. P.;* Teignmouth, *Dr. J.*, Alphington, *H. D.* (at sugar).

167. **L. turca,** *Lin.*

Pha-Noctua turca, Lin. Sys. Nat. ii. 847.
Mythimna turca, West. & Hum. Brit. Moth. i. 141, pl. 29, fig. 1-2.
Leucania turca, Staint. Man. i. 187.

Not generally distributed. Inhabits woody places. Is captured by "sugaring."

App.—June.

Loc.—Kingsbridge; Werrington Park;—Torquay, *R. B. R.*; Alphington, *H. D.*

168. **L. lithargyria,** *Esp.*

Noctua lythargyria, Esp. Schmett. Europ. iv. 341.
Mythimna Lythargyria, West. & Hum. Brit. Moth.
Leucania lithargyria, Staint. Man. i. 188.

An abundant species throughout both counties.

169. **L. putrescens,** *Hüb.*

Noctua putrescens Hüb. Noct. pl. 156, fig. 730.
Lucania putrescens, Ent. Ann. p. 130, 1850; Ent. Ann. pl. fig. 2. 1852.

Abundant but local.

App.—July and August.

Loc.—Torquay, *Dr. B.*; Teignmouth, *Dr. J.*

This addition to the British Fauna was made in 1859, through the exertions of the Lepidopterists of Torquay, and was recorded in the Entomologist's Intelligencer of that year, page 174. Dr. Battersby and Mr. Stewart both mention that this insect was attracted by bramble blossom. Since its discovery, it has appeared every year, and been captured in great numbers by several collectors of Lepidoptera.

L. putrescens in England is strictly Devonian, and on the continent of Europe has not a large geographical distribution, being a known inhabitant only of the south and west provinces of France.

170. **L. littoralis,** *Curt.*

Lucania littoralis, Curt. Brit. Ent. iv. pl. 157.—Staint. Man. i. 188.

Not unfrequent, but very local. An inhabitant of the regions of "blown sands," on coasts.

App.—July.

Loc.—Slapton sands; Whitsands;—Instow, *G. F. M.*

Both Mr. Mathew and Mr. J. S. Dell have bred this insect from *larvæ* found on sandhills.

171. **L. comma,** *Lin.*

Pha-Noctua comma, Lin. Sys. Nat. ii. 850.
Lucania comma, West. & Hum. Brit. Moth. i. 216, pl. 47, fig. 2.—Staint. Man. i. 189.

App.—

Loc.—Wembury; St. Germans;—Barnstaple, *G. F. M.* (abundant); Bickleigh, *J. S. D.*

172. **L. impura,** *Hüb.*

Noctua impura, Hüb. Europ. Schmett. pl. 85, 396.
Lucania impura, West. & Hum. Brit. Moth. i. 216, pl. 47, fig. 3-4.

Common.

App.—June, July, and August.

Loc.—Jenny-cliff; Wembury; Whitsands; St. Germans.—Barnstaple, *G. F. M.*; Torquay, *Dr. B.*; Exeter, *E. P.*; Teignmouth, *Dr. J.*

173. **L. pallens,** *Lin.*

Pha-Noctua pallens, Lin. Sys. Nat. ii. 838.
Leucania pallens, West. & Hum. Brit. Moth. i. 217, pl. 47, fig. 7-8.—Staint. Man. i. 190.

The commonest of the genus.

App.—June—September.

Loc.—Wherever coarse grasses abound.

Gen. **NONAGRIA,** *Och.*

174. **N. fulva,** *Hüb.*

Noctua fulva, Hüb. Noct. pl. 106, fig. 496.
Leucania pygmina, West. & Hum. Brit. Moth. i. 219, pl. 47, fig. 9.
Nonagria fulva, Staint. Man. i. 192.

A local insect, occurring only in two places over the area assigned to our *Fauna*.

Loc.—Teignmouth, *Dr. J.;* Exeter, *E. P.*

175. **N. Typhæ,** *Thunb.*

Noctua Typhæ, Thunb. Inst Suec. 3.
Nonagria Typhæ, West. & Hum. Brit. Moth. i. 214, pl. 46, fig. 1-3.—Staint. Man. i. 194.

Abundant at Barnstaple and Torquay.

App.—August.

Loc.—Ford, Devonport; St. Germans;—Torquay, *R. B. R.;* Barnstaple, *G. F. M.;* Exeter, *E. P.*

176. **N. crassicornis,** *Hüb.*

Nonagria lutosa, Hüb. Europ. Schmett. pl. 48, fig. 232.
Nonagria crassicornis, West. & Hum. Brit. Moth. i. 214, pl. 46, fig. 4-10.—Staint. Man. i. 194.

Loc.—Torquay, *R. B. R.;* Teignmouth, *Dr. J.*

FAMILY.—APAMIDÆ, Gn.

Gen. **GORTYNA,** *Och.*

177. **G. flavago,** *Schiff.*

Noctua flavago, Schiff. Wien. Verz. 86.
Gortyna flavago, West. & Hum. Brit. Moth. i. 213, pl. 47, fig. 16-17.—Staint. Man. i. 196.

Generally distributed and frequent.

App.—July—September.

Loc.—Crabtree; Ford, Devonport; Bickleigh Vale; Shaugh; Horrabridge; Tavistock; Beer-Alston; St. Germans; St. Cleerdown;—Exeter, *E. P.;* Torquay, *Dr. B.*

NOTE.—The caterpillar is found commonly in the flowerstalk of the Foxglove, mining the centre. In Devon and Cornwall it affects this plant, in preference to the Burdock *(Arctium Lappa)*, and the Water Betony *(Scrophularia aquatica)*.

Gen. **HYDRŒCIA,** *Gn.*

178. **H. nictitans,** *Lin.*

Pha-Noctua nictitans, Lin. Sys. Nat. ii. 847.
Apamea nictitans, West. & Hum. Brit. Moth. i. 177, pl. 37.
Hydrœcia nictitans, Staint. Man. i. 197.

Very local, but numerous in some places.

App.—July.

Loc.—Wembury; Bigbury; Bolthead;—Torquay, *Dr. B.* and *R. B. R.*; Exeter, *E. P.*

179. **H. micacea,** *Esp.*

Noctua micacea, Esp. Schmett. Europ. iv. 145.
Gortyna micacea, West. & Hum. Brit. Moth.
Hydrœcia micacia, Staint. Man. i. 198.

Not rare. Often attracted by rays from gaslight; and frequently found inside lamps scorched and disabled.

App.— September.

Loc.—Suburbs of Plymouth; Whitsand-cliffs; Wembury; Berryhead;—Barnstaple, *G. F. M.*

Gen. **AXYLIA,** *Hüb.*

180. **A putris,** *Lin.*

Pha-Noctua putris, Lin. Sys. Nat. ii. 850.
Xylina putris, West. & Hum. Brit. Moth. i. 154, pl. 31, fig. 5.
Axylia putris, Staint. Man. i. 198.

Abundant both in Devon and Cornwall.

App.—July and August.

Loc.—Plymouth Hoe; Oreston; Wembury; Whitsand cliffs; St. Cleer;—Barnstaple, *G. F. M.*; Torquay, *Dr. B.*; Falmouth, *Faun. Fal.*; Teignmouth, *Dr. J.*

Gen. **XYLOPHASIA,** *Steph.*

181. **X. rurea,** *Fab.*

Noctua rurea, Fab. Mant. ii. 184.
Xylophasia rurea, West. & Hum. Brit. Moth. i. 159, pl. 32, fig. 4.—Staint. Man. i. 199.

A common insect throughout the range of our local *fauna.* It comes freely to "sugar."

App.—June and July.

Loc.—Pastures around Plymouth; Wembury; Plymstock; Ivybridge; Bickleigh-vale;—Torquay, *Dr. B.;* Exeter, *E. P.;* Barnstaple, *G. F. M.;* Falmouth, *Faun. Fal.;* Teignmouth, *Dr. J.*

182. **X. lithoxylia,** *Schiff.*

Noctua lithoxylia, Schiff. Wien. Verz. 75.
Xylophasia lithoxylia, West. & Hum. Brit. Moth. i. 158, pl. 32, fig. 1.—Staint. Man. i. 199.

Like the preceding species in habit and as commonly met with; occurring on same dates and in similar situations.

183. **X. sublustris,** *Esp.*

Noctua sublustris, Esp. Schmett. iv. 408.
Xylophasia sublustris, West. & Hum. Brit. Moth. i. 158, pl. 32, fig. 1.—Staint. Man. i. 200.

Once on the Moors; Harford Bridge.

184. **X. polyodon,** *Lin.*

Pha-Noctua polyodon, Lin. Sys. Nat. ii. 853.
Xylophasia polyodon, West. & Hum. Brit. Moth. i. 156, pl. 32, fig. 3.—Staint. Man. i. 200.

Abundant in every grassy place over Devon and Cornwall.

App.—June—August.

185. **X. hepatica,** *Lin.*

Pha-Noctua hepatica, Lin. Sys. Nat. ii. 853.
Xylophasia characterea, West. & Hum. Brit. Moth. i. 140, pl. 32, fig. 6-7.
Xylophasia hepatica, Staint. Man. i. 200.

Common, but not so generally distributed as the species mentioned next above.

App.—July.

Loc.—Plymouth ; Bickleigh-vale ; Tavistock ; St. Germans ; Mt. Edgcumbe; Wembury ;—Barnstaple, *G. F. M.;* Exeter, *E. P.;* Torquay, *Dr. B.;* Teignmouth, *Dr. J.*

186. **X. scolopacina,** *Esp.*

Noctua scolopacina, Esp. Schmett. iv. 394.
Xylophasia scolopacina, West. & Hum. Brit. Moth. i. 160, pl. 32, fig. 8.—Staint. Man. i. 200.

To Mr. Mathew is due the credit of making *X. scolopacina* a west country insect. Until this Lepidopterist observed it near Barnstaple, in 1857, the species was considered a North British insect. It is common however in the neighbourhood of Barnstaple, and the Rev. Mr. Hellins has recently obtained it in his garden at Exeter, thus showing that its range is more extended than had been suspected.

Gen. **DIPTERYGIA,** *Steph.*

187. **D. Pinastri,** *Lin.*

Pha-Noctua Pinastri, Lin. Sys. Nat. ii. 851.
Dypterigia Pinastri, West. & Hum. Brit. Moth. i. 153, pl. 30, fig. 16.—Staint. Man. i 201.

Rare.

App.—June.

Loc.—Bickleigh-vale ;—Torquay, *Dr. B.*

Gen. **APOROPHYLA,** *Gn.*

188. **A. australis,** *Bois.*

Xylina australis, Bois. Ind. Meth. add. 6.
Agrotis pascuea, West. & Hum. Brit. Moth. i. 123, pl. 24, fig. 2.
Aporophyla australis, Staint. Man. i. 202.

Very local. A coast insect, found on grassy slopes inclined to the sea.

App.—August and September.

Loc.—Whitsand cliffs ; Bolthead ;—Torquay, *Dr. B.*, *R. B. R.*

Gen. **LAPHYGMA,** *Gn.*

189. **L. exigua,** *Hüb.*

Noctua exigua, Hüb. Noct. pl. 362 (? bad plate).
Laphygma exigua, Staint. Man. i. 202.; Ent. Ann. 1857, pl. fig. 6.

The only authority for considering this insect Devonian, is that of Dr. Battersby, who captured a specimen at Torquay. The gas-lamps at Plymouth have yielded, however, injured specimens at various times, that could not be assigned to any other species than this.

Gen. **NEURIA,** *Gn.*

190. **N. Saponariæ,** *Bork.; Esper.* (?)

Pha-Noctua Saponariæ, Bork. Europ. Schmett. iv. 370.
Hadena Saponariæ, West. & Hum. Brit. Moth. i. 168, pl. 34, fig. 11.
Neuria Saponariæ, Staint. Man. i. 203.

Rare and local.

App.—July.

Loc.—Whitsand-cliffs; Crabtree; Slapton;—Torquay, *Dr. B.*

Gen. **HELIOPHOBUS,** *Bois.*

191. **H, popularis,** *Fab.*

Noctua popularis, Fab. Mant. ii. 133.
Heliophobus popularis, West. & Hum. Brit. Moth. pl. 35.—Staint. Man. i. 203.

Common. Easily attracted by light.

App.—August and September.

Loc.—Hoe, Greenbank, Cattedown, Plymouth; Bickleigh-vale; Ivybridge;—Barnstaple, *G. F. M.;* Exeter, *E. P.;* Torquay, *R.B.R.;* Teignmouth, *Dr. J.*

192. **H. hispida,** *Hüb.*

Noctua hispida, Hüb. Noct. pl. 166, fig. 784-6.
Heliophobus hispida, Staint. Man. i. 204.

First discovered as a British insect and Devonian by Mr. Ball, at Exmouth. Being strictly a coast insect, it is necessarily local. It is not however, at all rare in its native haunts, which are where the herbage grows on the tops and margins of rocks by the sea. This is considered a rare species by most Lepidopterists who know not its habits and who are non-resident either at Plymouth, Torquay, and a few other places along the south-east or south-west coasts. It is sparingly allured by bright illuminations, but cannot be said to be much fascinated even with powerful rays of light. During the boxing of 180 specimens, which occupied five or six evenings, no higher number than half-a dozen exhibited a desire to move, and then it was *from*, not *to*, the light. Its sluggishness is remarkable. It will stay clinging to the herbage a few inches from the ground, showing little uneasiness at a person's approach. The time to take it is from dusk to midnight.

App.—September and October.

Loc.—Rocks under Hoe and Citadel, Plymouth; Torquay, *R. B. R.*; Teignmouth, *Dr. J.*; Exmouth, *Mr. White.*

Gen. **CHARÆAS,** *Steph.*

193. **C. Graminis,** *Lin.*

Pha-Bombyx Graminis, Lin. Sys. Nat. ii. 830.
Cerapteryx Graminis, West. & Hum. Brit. Moth. pl. 22, fig. 8.
Charæas Graminis, Staint. Man. i. 204.

Not uncommon on moors and downs.

App.—August.

Loc.—Ugborough-beacon; Whitsand-cliffs; once at gas-light in a Shop in Navy-row, Devonport.

Gen. **CERIGO,** *Steph.*

194. **C. Cytherea,** *Fab.*

Noctua Cytherea, Fab. Mant. ii. 108.
Cerigo Cytherea, West. & Hum. Brit. Moth. i. 109, pl. 21, fig. 10.—Staint. Man. i. 205.

Rare. Comes to "sugar."

App.—August.

Loc.—Wembury; Brixham; Berry-Pomeroy;—Torquay, *R.B.R.*; near Cann Quarry, *J. S. D.*

Gen. **LUPERINA,** *Bois.*

195. **L. testacea,** *Schiff.*

Noctua testacea, Schiff. Wien. Verz. 81.
Hama testacea, West. & Hum. Brit. Moth. i. 171, pl. 35, fig. 9.
Luperina testacea, Staint. Man. i. 206.

Common to all districts throughout Devon and Cornwall, but particularly at Plymouth, where it and its many varieties are very abundant.

App.—August and September.

196. **L. cespitis,** *Schiff.*

Noctua cespitis, Schiff. Wien. Verz. 82.
Charæas cespitis, West. & Hum. Brit. Moth. i. 111, pl. 22, fig. 4-5.
Luperina cespitis, Staint. Man. i. 206.

Rare and local.

App.—September.

Loc.—Hoe, Plymouth;—Barnstaple, *G. F. M.;* Mount Edgcumbe, *J. S. D.*; Exmouth Warren, *Mr. Buckton.*

Gen. **MAMESTRA,** *Och.*

197. **M. anceps,** *Hüb.*

Noctua anceps, Hüb. Noct. pl. 102, fig. 484.
Noctua contigua, Haw. Lep. Brit. 192.
Hama aliena, West. & Hum. Brit. Moth. i. 170, pl. 35, fig. 6.
Mamestra anceps, Staint. Man. i. 208.

Scarce and not generally distributed.

Loc.—Whitsand-cliffs; Wembury;—Torquay, *Dr. B.;* Barnstaple, *G. F. M.;* Exeter, *E. P.;* Alphington, *H. D.;* Teignmouth, *Dr. J.*

198. **M. furva,** *Schiff.*

Noctua furva, Schiff. Wien. Verz. 81.
Mamestra furva, Staint. Man. i. 208.

Very local and very rare, having occurred but twice within the area of our *Fauna.*

App.—June.

Loc.—Whitsand-bay;—Keyham, *J. S. D.*

199. **M. Brassicæ,** *Lin.*

Pha-Noctua Brassicæ, Lin. Sys. Nat. ii. 852.
Mamestra Brassicæ, West. & Hum. Brit. Moth. i. 174, pl. 36, fig. 8-9.—Staint. Man. i. 208.

One of our commonest moths. The caterpillar is very destructive to cabbages. It also feeds on the floral leaves and foliage of many dissimilar plants.

App.—May—July.

200. **M. Persicariæ,** *Lin.*

Pha-Noctua Persicariæ, Lin. Sys. Nat. ii. 847.
Mamestra Persicariæ, West. & Hum. Brit. Moth. i. 175, fig. 11-12.—Staint. Man. i. 209.

Abundant in North Devon and not uncommon in the South of the county.

App.—June and July.

Loc.—Crabtree; Bickleigh; North Buckland; Anthony; Liskeard;—Barnstaple, *G. F. M.;* Torquay, *Dr. B.;* Exeter, *E. P.;* Teignmouth, *Dr. J.*

Gen. **APAMEA,** *Gn.*

201. **A. basilinea,** *Schiff.*

Noctua basilinea, Wien. Verz. 78.
Hama basilinea, West. & Hum. Brit. Moth. i. 170, pl. 35, fig. 7-8.
Apamea basilinea, Staint. Man. i. 210.

A generally distributed and common species.

App.—June.

Loc.—In all the urban and suburban sylvan places around Plymouth;—Barnstaple, *G. F. M.* ("abundant"); Torquay, *Dr. B.;* Exeter, *E. P.;* Teignmouth, *Dr. J.*

202. **A. gemina,** *Och.*

Hadena gemina, Och. Schmett. Europ. iv. 72.
Hadena remissa, West. & Hum. Brit. Moth. i. 162, pl. 33, fig. 2.
Apamea gemina, Staint. Man. i. 210.

The same œconomy as *A. basilinea.*

203. **A. unanimis,** *Hüb.*

Noctua unanimis, Hüb. Noct. pl. 120, 556.
Apamea secalina, West. & Hum. Brit. Moth. i. 178, pl. 37, fig. 6.
Apamea unanimis, Staint. Man. i. 210.

Very local.

App.—

Loc.—Exeter, *E. P.;* Torquay, *Dr. B.*

204. **A. oculea,** *Fab.*

Noctua oculea, Fab. Mant. ii. 179.
Apamea didyma, Steph. Ill. Haust. iii. 8.
Apamea oculea, West. & Hum. Brit. Moth.—Staint. Man. i. 211.

Abundant throughout both Devon and Cornwall.

App.—July and August.

Gen. **MIANA,** *Steph.*

205. **M. strigilis,** *Lin.*

Pha-Noctua strigilis, Lin. Sys. Nat. ii. 851.
Miana strigilis, West. & Hum. Brit. Moth. i. 181, pl. 38, fig. 2-4.—Staint. Man. i. 212.

Everywhere common within the boundary line of the two counties. Comes freely to "sugar."

App.—June and July.

206. **M. fasciuncula,** *Haw.*

Noctua fasciuncula, Haw. Lep. Brit. 215.
Miana fasciuncula, West. & Hum. Brit. Moth. i. 181, pl. 38, fig. 10.—Staint. Man. i. 212.

Not uncommon.

App.—July.

Loc.—Hoe, Plymouth; Wembury; Bolthead;—Torquay, *Dr.B.;* Exeter, *E. P.;* Falmouth, *Faun. Fal.*

207. **M. literosa,** *Haw.*

Noctua literosa, Haw. Lep. Brit. 213.
Miana literosa, Staint. Man. i. 213.

App.—July.

Loc.—Wembury; Totnes; Whitsands; — Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.*; Alphington, *H. D.*

208. **M. furuncula,** *Schiff.*

Noctua furuncula, Wien. Verz. 89.
Noctua numeralis, West. & Hum. Brit. Moth. i. 180, pl. 38, fig. 5-8.
Miana furuncula, Staint. Man. i. 213.

Common at flowers just before dusk, and at "sugar."

App.—July to September.

Loc.—Quarries, Catte-down; Crabtree; Plymbridge; Liskeard; —Torquay, *R. B. B.;* Exeter, *E. P.;* Falmouth, *Faun. Fal.;* Teignmouth, *Dr. J.*

209. **M. arcuosa,** *Haw.*

Phytometra arcuosa, Haw. Lep. Brit. 260.
Acosmetia arcuosa, West. & Hum. Brit. Moth. i. 245, pl. 54, fig. 7.
Miana arcuosa, Staint. Man. i. 213.

Not generally distributed.

App.—

Loc.—Bickleigh Vale;—Torquay, *Dr. B.;* Lympstone, *Dr. J.;* Exeter, *E. P.*

FAMILY.—CARADRINIDÆ, *Gn.*

Gen. **GRAMMESIA,** *Steph.*

210. **G. trilinea,** *Schiff.*

Noctua trilinea, Schiff. Wien. Verz. 84.
Grammesia trilinea, West. & Hum. Brit. Moth. i. 146, pl. 29, fig. 17.—Staint. Man. i. 215.

Var. *bilinea,* (authors).

Abundant at Barnstaple, where the var. *bilinea* occurs; not rare at Torquay, and near Plymouth.

App.—June.

Loc.—Bickleigh-vale; Wembury;—Torquay, *R. B. R.;* Exeter, *E. P.;* Barnstaple, *G. F. M.;* Morice Town, *J. S. D.;* Teignmouth, *Dr. J.*

Gen. **CARADRINA,** *Och.*

211. **C. Morpheus,** *Naturk.*

Pha-Noctua Morpheus, Nat. Berl. Mag. iii. 302.
Caradrina Morpheus, West. & Hum. Brit. Moth. i. 145, pl. 29, fig. 13-14.—Staint. Man. i. 217.

Generally distributed and not uncommon.

App.—June, July, and sometimes August.

Loc.—Plymouth; Longbridge; Plymstock; Hooe; Totnes; St. Germans;—Barnstaple, *G. F. M.;* Exeter, *E. P.;* Falmouth, *Faun. Fal.*

212. **C. blanda,** *Schiff.*

Noctua blanda, Schiff. Wien. Verz. 77.
Caradrina Plantaginis, West. & Hum. Brit. Moth. i. 144, pl. 29, fig. 11.
Caradrina blanda, Staint. Man. i. 217.

Every season plentifully.

App.—July.

Loc.—Plymouth; Whitsand-heights; Wembury; Jennycliff; Crabtree;—Exeter, *E. P.;* Barnstaple, *G. F. M.;* Torquay, *Dr. B.;* Teignmouth, *Dr. J.*

213. **C. cubicularis,** *Schiff.*

Noctua cubicularis, Schiff. Wien. Verz. 72.
Caradrina cubicularis, West. & Hum. Brit. Moth. i. 145, pl. 29, fig. 15.—Staint. Man. i. 218.

The commonest of the genus, occurring everywhere within the area of the two counties, except the highest regions.

App.—June—August.

FAMILY.—NOCTUIDÆ, *Steph. Gn.*

Gen. **RUSINA,** *Steph.*

214. **R. tenebrosa,** *Hüb.*

Noctua tenebrosa, Hüb. Noct. pl. 33, fig. 158.
Rusina tenebrosa, West. & Hum. Brit. Moth. i. 113, pl. 22, fig. 9.—Staint. Man. i. 220.

Rather scarce. Occurring at gas-lamps and at "sugar." According to Mr. J. S. Dell, at the flowers of the *genus Silene.*

App.—May and June.

Loc.—Woodside, North-hill, Plymouth; Crabtree; Wembury; Bickleigh Vale; Ivybridge;—Torquay, *R. B. R.;* Exeter, *E. P.;* Barnstaple, *G. F. M.;* Ashburton and Teignmouth, *Dr. J.*

Gen. **AGROTIS,** *Och.*

215. **A. valligera,** *Schiff.*

Noctua valligera, Schiff. Wien. Verz. 80.
Agrotis valligera, West. & Hum. Brit. Moth. i. 117, pl. 23, fig. 11.—Staint. Man. i. 223.

A maritime species and common.

App.—July and August.

Loc.—Whitsand-bay; Bigbury-bay; Slapton-ley; Budleigh-Salterton;—Torquay, *R. B. R.;* Braunton-burrows, *G. F. M.;* Dawlish Warren, *Dr. J.*

216. **A. puta,** *Hüb.*

Noctua puta, Hüb. Noct. 52, fig. 55 (?).
Agrotis radia, West. & Hum. Brit. Moth. i. 117, pl. 23, fig. 12.
Agrotis puta, Staint. Man. i. 223.

Not common. Occurs at gaslights and "sugar."

App.—August and September.

Loc.—Tothill-lane, Mutley, Plymouth; Knackersknowle; Millbrook;—Torquay, *R. B. R.;* Barnstaple, *G. F. M.;* Teignmouth, *Dr. J.;* Alphington, *H. D.*

217. **A. suffusa,** *Schiff.*

Noctua suffusa, Schiff. Wien. Verz. 80.
Agrotis suffusa, West. & Hum. Brit. Moth. i. 116, pl. 23, fig. 2.—Staint. Man. i. 223.

Generally common.

App.—August and September.

218. **A. saucia,** *Hüb.*

Noctua saucia, Hüb. Noct. pl. 81, fig. 378.

Agrotis saucia, West. & Hum. Brit. Moth. i. 115, pl. 23, fig. 1.—Staint. Man. i. 224.

Common in particular years. In 1858 it was very abundant. The perfect insect is partial to the saccharine fluid exuding from over-ripe pears: it is also fond of, and comes freely to "sugar." Mr. Mathew has found the caterpillar in potato fields. Mr. J. S. Dell procured it from ivy blossom.

App.—September.

Loc.—Gardens, Ham Street, Woodside, Plymouth; Ivybridge; Bickleigh Vale; Liskeard;—Torquay, *Dr. B.;* Exeter, *E. P.;* Barnstaple, *G. F. M.;* Teignmouth, *Dr. J.;* Alphington, *H. D.*

219. **A. segetum,** *Schiff.*

Noctua segetum, Schiff. Wien. Verz. 252.

Agrotis segetum, West. & Hum. Brit. Moth. i. 116, pl. 23, fig. 3.—Staint. Man. i. 224.

Very common everywhere.

220. **A. lunigera,** *Steph.*

Agrotis lunigera, Steph. Illust. Haust. ii. 113.—Staint. Man. i. 224.

Rare.

App.—August.

Loc.—Whitsands; Wembury; Bolthead;—Torquay, *R. B. R.*

221. **A. exclamationis,** *Lin.*

Pha-Noctua exclamationis, Lin. Sys. Nat. ii. 850.

Agrotis exclamationis, West. & Hum. Brit. Moth. i. 124, fig. 13-14.—Staint. Man. i. 224.

The type of this species, together with many of its numerous varieties, occurs commonly throughout Devon and Cornwall. This is not only the most abundant of the *genus,* but is in number equal to the commonest of the family.

App.—June—August.

222. **A. corticea,** *Hüb.*

Noctua corticea, Hüb. Noct. pl. 31, fig. 145.
Agrotis corticea, West. & Hum. Brit. Moth. i. 115, pl. 23, fig. 6.—Staint. Man. i. 225.

Not unfrequent at gas-lamps.

App.—June and July.

Loc.—Woodside, Mutley, Hoe, Plymouth;—Stoke, *J. S. D.;* Torquay, *Dr. B.;* Teignmouth, *Dr. J.*

223. **A. cinerea,** *Schiff.*

Noctua cinerea, Schiff. Wien. Verz. 80.
Agrotis cinerea, Steph. Illus. Haust. ii. 127.—Staint. Man. i. 225.

Rare. Has occurred only once in the Plymouth district. Not uncommon at lamps near Torquay.

App.—June.

Loc.—Citadel-road, Plymouth;—Torquay, *Dr. B.*

224. **A. ripæ,** *Hüb.*

Noctua ripæ, Hüb. Noct. pl. 151. fig. 702, 703.
Agrotis nebulosa, Steph. Illust. Haust. ii. 127, pl. 22, fig. 1.
Agrotis ripæ, Staint. Man. i. 225.

A local species and rare. Its habitats are those semi-marine sands situated in bays on the coast, or along great channels near the entrances to rivers from the ocean.

App.—

Loc.—Instow Sandhills, and Braunton Burrows. *G. F. M.;* Dawlish, *R. B. R.;* Exmouth, *E. P.*

225. **A. nigricans,** *Lin.*

Pha-Noctua nigricans, Lin. Sys. Nat. ii. 855.
Agrotis nigricans, Steph. Illust. Haust. ii. 123.—Staint. Man. i. 225.

Rare.

App.—July.

Loc.—Bickleigh vale;—Exeter, *E. P.;* Teignmouth, *Dr. J.*

226. **A. Tritici,** *Lin.*

Pha-Noctua Tritici, Lin. Sys. Nat. ii. 855.
Agrotis Tritici, Steph. Illust. Haust. ii. 121.—Staint. Man. i. 226.

Rare in the districts of Plymouth and Barnstaple, and common at Exeter.

App.—August.

Loc.—Woodside, Embankment-road, Hoe, Plymouth;—Stoke, *J. S. Dell;* Exeter, *E. P.;* Barnstaple, *G. F. M.;* Teignmouth, *Dr. J.*

227. **A. aquilina,** *Schiff.*

Noctua aquilina, Schiff. Wien. Verz. 80.
Agrotis aquilina, Steph. Illust. Haust. ii. 121.—Staint. Man. i. 226.

Once at a gas-lamp near the house in which Dr. Leach was born (Hoegate-House), Plymouth.

228. **A. obelisca,** *Schiff.*

Noctua obelisca, Schiff. Wien. Verz. 80.
Agrotis pupillata, Steph. Illust. Haust. ii. 128.
Agrotis obelisca, Staint. Man. i. 226.

Rare. Attracted by "sugar" and light.

Loc.—Longroom, Stonehouse; Mount Edgcumbe.

229. **A. agathina,** *Dup.*

Chersotis agathina, Dup. Lep. Franc. vii. 359, pl. 122, fig. 2.
Lytæa albimacula, Steph. Illust. Haust. ii.
Lytæa leucographa, Wood. Ind. Ent. pl. 8, fig. 19.
Agrotis agathina, Staint. Man. i. 227.

The only authority for including this *Noctua* in the list of Devon and Cornish Lepidoptera is that of Mr. Dorville, who captured it in his garden, at Alphington.

230. **A. porphyrea,** *Schiff.*

Noctua porphyrea, Schiff. Wien. Verz. 83.
Scotophila porphyrea, Steph. Illust. Haust. iii. 19.
Agrotis porphyrea, Staint. Man. i. 227.

Plentiful on moors. Found on the wing late in the afternoon.

App.—July.

Loc.—Harford; Shaugh; Ugborough-beacon;—Exeter, *E. P.*; Haldon, *Dr. J.*

231. **A. præcox,** *Lin.*

Pha-Noctua præcox, Lin. Sys. Nat. ii. 854.
Actebia præcox, Steph. Haust. iii. 21.
Agrotis præcox, Staint. Man. i. 227.

Local.

Has been observed both on the north and south coasts of Devon; but in the neighbourhood of Plymouth this pretty insect has not yet fallen to the share of any local Lepidopterist. There are several districts, east and west of Plymouth, that are quite congenial to the habits of this moth, and which will, probably, some day, be found to yield it. Whitsands and Slapton-sands are places suited to the nature of this species; and there is little doubt that it roves, in all its wild glory, in both of these localities.

App.—August.

Loc.—Braunton Burrows, *G. F. M.*; Dawlish Warren, *Dr. J.*

232. **A. ravida,** *Schiff.*

Noctua ravida, Schiff. Wien. Verz. 80.
Graphiphora crassa, West. & Hum. Brit. Moth. i. 127, pl. 25, fig. 5.
Agrotis ravida, Staint. Man. i. 227.

The only authenticated account of this insect being either Devonian or Cornish, is from Mr. Dorville, who takes it at Alphington. This moth is said, however, to be taken also at Torquay.

233. **A. lucernea,** *Lin.*

Pha-Noctua lucernea, Lin. Sys. Nat. ii. 837.
Graphiphora renigera, West. & Hum. Brit. Moth. i. 126, pl. 25, fig. 2-3.
Agrotis lucernea, Staint. Man. i. 228.

Rare.

At one time this was considered exclusively a north country insect. About thirty years ago, however, it was discovered to be a native of the south-east of England, and in 1855 was found to inhabit Whitsand-cliffs; since which time, it has been taken in several other places in Devon and Cornwall.

It possesses the habit, common to some other *Noctuæ*, of flying from flower to flower, in sunshine.

App.—

Loc.—Whitsand-cliffs; Bovisand;—Torquay, *Mr. J. Buckton.*

Gen. **TRIPHÆNA,** *Och.*

234. **T. Ianthina,** *Schiff.*

Noctua ianthina, Schiff. Wien. Verz. 78.

Triphæna ianthina, West. & Hum. Brit. Moth. i. 109, pl. 21, fig. 9.—Staint. Man. i. 229.

Common throughout the two counties.

App.—August.

235. **T. fimbria,** *Lin.*

Pha-Noctua fimbria, Lin. Sys. Nat. ii. 842.

Triphæna fimbria, West. & Hum. Brit. Moth i. 108, pl. 21, fig. 6, 7, 13.—Staint. Man. i. 229.

Common in the south and south-western portions of Devon; rare in the north of the county; but not yet observed in west Cornwall.

App.—June and September.

Loc.—Woodside, Plymouth; Plymbridge; Ivybridge; Totnes;—Torquay, *Dr. B.;* Exeter, *E. P.;* Barnstaple, *G. F. M.;* Teignmouth, *Dr. J.*

236. **T. interjecta,** *Hüb.*

Noctua interjecta, Hüb. Noct. pl. 23, fig. 107.

Triphæna interjecta, West. & Hum. Brit. Moth. i. 109, pl. 21, fig. 8.—Staint. Man. i. 230.

Not uncommon in some localities.

App.—

Loc.—Plymouth; Wembury; Millbrook; Liskeard; Tavistock;—Barnstaple, *G. F. M.;* Torquay, *Mr. Buckton;* Exeter, *E. P.;* Teignmouth, *Dr. J.*

237. **T. orbona,** *Fab.*

Noctua orbona, Fab. Man. ii. 150.

Triphæna orbona, West. & Hum. Brit. Moth. i. 108, pl. 21, fig. 4-12.—Staint. Man. i. 230.

Common in almost every locality in Devon and Cornwall.

238. **T. pronuba,** *Lin.*

Pha-Noctua pronuba, Lin. Sys. Nat. ii. 842.

Triphæna pronuba, Staint. Man. i. 231.

Very common everywhere.

App.—From the beginning of June and continues through the summer.

Gen. **NOCTUA,** *Gn.*

239. **N. glareosa,** *Esp.*

Noctua glareosa, Esp. Schmett. iv. pl. 120.—Staint. Man. i. 233, fig. 1.

Not uncommon on moors and downs.

App.—September.

Loc.—Bovisand; Bolthead; Ugborough-beacon; Ivybridge; St. Cleer;—Torquay, *Dr. B.;* Dawlish, *Dr. J.*

240. **N. depuncta,** *Lin.*

Pha-Noctua depuncta, Lin. Sys. Nat. ii. 858.

Noctua depuncta, Staint. Man. i. 233, fig. 2.

Local and rare.

App.—

Loc.—Yealmpton; Harford-bridge;—Exeter, *E. P.;* Alphington, at "sugar," *H. D.*

Mr. J. S. Dell has taken this moth, but cannot remember where.

241. **N. augur,** *Fab.*

Noctua augur, Fab. Mant. ii. 152.

Graphiphora augur, West. & Hum. Brit. Moth. i. 127, pl. 35, fig. 6.

Noctua augur, Staint. Man. i. 234.

Scarce.

App.— July.

Loc.—Longbridge; Hooe;—Torquay, *Dr. B.;* Barnstaple, *G. F. M.*

242. **N. plecta,** *Lin.*

Pha-Noctua plecta, Lin. Sys. Nat. ii. 851.
Graphiphora plecta, West. & Hum. Brit. Moth. i. 133, pl. 26, fig. 7.
Noctua plecta, Staint. Man. i. 234.

Common throughout the two counties of Devon and Cornwall

App.—June.

243. **N. C-nigrum,** *Lin.*

Pha-Noctua C-nigrum, Lin. Sys. Nat. ii. 852.
Graphiphora C-nigrum, West. & Hum. Brit. Moth. i. 132, pl. 26, fig. 4.
Noctua C-nigrum, Staint. Man. i. 234.

Common in and near woods. It is attracted both by light and "sugar."

App.—August.

Loc.—Plymouth ; Radford-wood ; Bickleigh-vale ; Ivybridge ; Tavistock ; Liskeard ;—Torquay, *R. B. R. ;* Exeter, *E. P. ;* Barnstaple, *G. F. M. ;* Teignmouth, *Dr. J.*

244. **N. ditrapezium,** *Hüb.*

Noctua ditrapezium, Hüb. Noct. pl. 24, fig. 113.
Graphiphora tristigma, West. & Hum. Brit. Moth. i. 129, pl. 25, fig. 10.
Noctua ditrapezium, Staint. Man. i. 234.

Very rare. Only four or five examples of this *Noctua* are known to have occurred within the counties of which we especially take cognizance. Several *larvæ* however have been found in the vicinity of Plymbridge and Bickleigh. These unfortunately did not complete their metamorphoses.

App.—

Loc.—Barnstaple, *G. F. M. ;* Devonport, *Mr. Dell ;* Torquay, *Mr. White ;* Lee-moor, *Mr. Turner.*

245. **N. triangulum,** *Fab.*

Noctua triangulum, Fab. Mant. ii. 145.
Graphiphora triangulum, West. & Hum. Brit. Moth. i. 130, pl. 26, fig. 3.
Noctua triangulum, Staint. Man. i. 235.

Not uncommon.

App.—June.

Loc.—Saltram ; Wembury ; Whitsands ; Plymbridge ;—Torquay, *Dr. B. ;* Exeter, *E. P. ;* Teignmouth, *Dr. J.*

246. **N. brunnea,** *Schiff.*

Noctua brunnea, Schiff. Wien. Verz. 83.
Graphiphora brunnea, West. & Hum. Brit. Moth. i. 128, pl. 25, fig. 11.
Noctua brunnea, Staint. Man. i. 235.

More common than *N. triangulum,* but not so frequent as *N. festiva,* and appears local.

App.—June and July.

Loc.—Plymouth; Bickleigh-vale; Ivybridge; Whitsand-cliffs; Mount Edgcumbe;—Torquay, *Dr. B.;* Harford Moor, *R. B. R.*

"The *larvæ* mostly on fern."—*R. B. R.*

Every one who has bred this insect must have noticed the deep rich tones with which the scales of the wings are tinted. These grand shadings of lake and brown and black lose brilliancy after the death of the moth.

247. **N. festiva,** *Schiff.*

Noctua festiva, Schiff. Wien. Verz. 77.
Graphiphora festiva, West. & Hum. Brit. Moth. i. 131, pl. 26, fig. 1.
Noctua festiva, Staint. Man. i. 236.

Generally common.

App.—June and July.

Loc.—Plymouth; Mount Batten; Bovisand; Salcombe; Totnes; Tavistock;—Torquay, *Dr. B.;* Harford-moors, *R. B. R.;* Barnstaple, *G. F. M.;* Teignmouth, *Dr. J.*

248. **N. Dahlii,** *Hüb.*

Noctua Dahlii, Hüb. Noct. pl. 99.
Graphiphora Dahlii, West. & Hum. Brit. Moth. i. 131, pl. 25, fig. 12.
Noctua Dahlii, Staint. Man. i. 236.

Not uncommon, but local.

Frequents open places in woods, where, at dusk, it is easily captured on the wing.

App.—August.

Loc.—Plymbridge; Shaugh-woods; Radford-wood;—Torquay, *Dr. B.;* Exeter, *E. P.;* Stokewood, *H. D.*

249. **N. bella,** *Bork.*

Noctua Rubi, Vieweg. Tab. Verz. ii. pl. 3, fig. 5 (1789).
Graphiphora bella, West. & Hum. Brit. Moth. i. 132, pl. 26, fig. 6.
Noctua bella, Staint. Man. i. 236.

Common at "sugar" in gardens, and the vicinity of woods.

App.—August.

Loc.—Bickleigh-vale; Ivybridge; Radford-wood; Liskeard;—Torquay, *Dr. B.;* Teignmouth, *Dr. J;* Exeter, *E. P.*; Alphington, *H. D.;* Barnstaple, *G. F. M.*

250. **N. umbrosa,** *Hüb.*

Noctua umbrosa, Hüb. Noct. pl. 97. fig. 459.
Lytæa umbrosa, West. & Hum. Brit. Moth. i. pl. 22, fig. 1.
Noctua umbrosa, Staint. Man. i. 237.

As common as the species mentioned next above; and though partially of the same habit, is also found on the coast.

App.—August.

Loc.—Wembury; Radford-wood; Jenny-cliff; Bickleigh-vale; Ivybridge;—Torquay, *Dr. B.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

251. **N. baja,** *Schiff.*

Noctua baja, Schiff. Wien. Verz. 77.
Graphiphora baja, West. & Hum. Brit. Moth. i. 130, pl. 25, fig. 8.
Noctua baja, Staint. Man. i. 237.

Common in Devon and some parts of Cornwall.

Comes freely to "sugar."

App.—July and August.

Loc.—Woods near Plymouth;—Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. B.;* Barnstaple, *G. F. M.;* Alphington, *H. D.*

252. **N. neglecta,** *Hüb.*

Noctua neglecta, Hüb. Noct. pl. 34, fig. 160.
Segetia neglecta, West. & Hum. Brit. Moth. i. 143, pl. 29, fig. 10.
Noctua neglecta, Staint. Man. i. 237.

Common on heaths and downs, but appears locally distributed. The species however is obtained plentifully by the method of "sugaring."

App.—August and September.

Loc.—Moors, Ivybridge; Ugborough beacon; Shaugh-downs; St. Cleer downs; Whitsand-heights;—Torquay, *R B. R.;* Exeter, *E. P.*

253. **N. xanthographa,** *Schiff.*

Noctua xanthographa, Schiff. Wien. Verz. 83.
Segetia xanthographa, West. & Hum. Brit. Moth. i. 143, pl. 29, fig. 9.
Noctua xanthographa, Staint. Man. i. 238.

One of the commonest of British *Noctuæ*, occurring in all the districts throughout both Devon and Cornwall.

Family.—ORTHOSIDÆ, *Gn.*

Gen. **TRACHEA,** *Gn.*

254. **T. piniperda,** *Esp.*

Noctua piniperda, Esp. Noct.
Achatia spreta, West. & Hum. Brit. Moth. i. 184, pl. 39, fig. 3-4.
Trachea piniperda, Staint. Man. i. 250.

Not common. Frequents sallow blossom in spring.

Loc.—Bickleigh-vale; Anthony; — Devonport, *J. S. D.;* Torquay, *Dr. B.;* Haldon, *H. D.;* near Dawlish, *Dr. J.;* Exeter, *E. P.*

Gen. **TÆNIOCAMPA,** *Gn.*

255. **T. Gothica,** *Lin.*

Pha-Noctua gothica, Lin. Sys. Nat. ii. 851.
Semiophora gothica, West. & Hum. Brit. Moth. i. 134, pl. 27, fig. 1.
Tæniocampa gothica, Staint. Man. i. 242.

Common in almost all the districts of both Devon and Cornwall. Often found in gas-lamps and obtained freely from the catkins of sallows.

App.—Spring.

Loc.—Gardens and lanes around Plymouth; Bickleigh-vale;—Torquay, *R. B. R.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

256. **T. leucographa,** *Schiff.*

Noctua leucographa, Schiff. Wien. Verz. 83.
Tæniocampa leucographa, Staint. Man. i. 242.

Rare.

App.—Spring.

Loc.—Lee-moor, *J. Turner;* Exeter, *H. Moore;* Barnstaple, *G. F. M.*

257. **T. rubricosa,** *Schiff.*

Noctua rubricosa, Schiff. Wien. Verz. 77.
Glæa rubricosa, Steph. Haust. ii. 160.
Tæniocampa rubricosa, Staint. Man. i. 243.

Rare.

App.—Spring.

Loc.—Woodside, Plymouth; Bickleigh-vale;—Torquay, *Dr. J.;* Exeter, *E. P.;* Barnstaple, *G. F. M.*

258. **T. instabilis,** *Schiff.*

Noctua instabilis, Schiff. Wien. Verz. 76.
Orthosia instabilis, West. and Hum. Brit. Moth. i. 134, pl. 27, fig. 2-4.
Tæniocampa instabilis, Staint. Man. i. 234.

Abundant.

App.—Spring.

Loc.—Throughout Devon and Cornwall.

259. **T. populeti,** *Fab.*

Bombyx populeti, Fab. Mant. ii. 130, No. 188.
Tæniocampa populeti, Staint. Man. i. 231.

Rare.

App.—Spring.

The only specimens known to have occurred within the area of the two counties, were taken from gas-lamps at Woodside, Plymouth.

260. **T. stabilis,** *Schiff.*

Noctua stabilis, Schiff. Wien. Verz. 76.
Orthosia stabilis, West. and Hum. Brit. Moth. i. 137, pl. 28, fig. 1.
Tæniocampa stabilis, Staint. Man. i. 243.

The commonest of the genus, unless *T. cruda* holds that position. It is found abundantly within the limits of our local *fauna*.

261. **T. gracilis,** *Schiff.*

Noctua gracilis, Schiff. Wien. Verz. 76.
Orthosia sparsa, West. and Hum. Brit. Moth. i. 136, pl. 28, fig. 12.
Tæniocampa gracilis, Staint. Man. i. 244.

Scarce.

App.—Spring.

Loc.—Plymouth ; Wembury ; Bickleigh ;—Devonport, *J. S. D.;* Torquay, *Dr. B., R. B. R.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

262. **T. miniosa,** *Schiff.*

Noctua miniosa, Schiff. Wien. Verz. 88.
Orthosia miniosa, West. & Hum. Brit. Moth. i. 137, pl. 28, fig. 2-3.
Tæniocampa miniosa, Staint. Man. i. 244.

Scarce.

App.—Spring.

Loc.—Radford Wood ; — Devonport, *J. S. D.;* Teignmouth, *Dr. J.;* Torquay, *Dr. B.;* Exeter, *E. P.;* Alphington, *H. D.*

263. **T. munda,** *Schiff.*

Noctua munda, Schiff. Wien. Verz. 76.
Orthosia munda, West. & Hum. Brit. Moth. i. 135, pl. 27, fig. 6.
Tæniocampa munda, Staint. Man. i. 244.

Common.

App.—Spring.

Loc.—Woodside, Plymouth ; Wembury ; Radford Wood ; Bickleigh-vale ; Ivybridge ; Mount Edgcumbe ; — Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

264. **T. cruda,** *Schiff.*

Noctua cruda, Schiff. Wien. Verz. 77.
Orthosia cruda, West. & Hum. Brit. Moth. i. 137, pl. 27, fig. 10-11.
Tæniocampa cruda, Staint. Man. i. 246.

Very abundant.

App.—Spring.

Loc.—In every wood of importance throughout the counties of Devon and Cornwall.

The members of the genus *Tæniocampa* are all vernal species. But, as the spring is early or late, so is their appearance. Some, however, have earlier habits than others. *T. stabilis* has come forth as early as the 5th of February, whilst its season, usually, is not much before March. *T. munda*, on the other hand, is not so hardy as some of its congeners, not appearing until about mid-March.

Gen. **ORTHOSIA,** *Gn.*

265. **O. upsilon,** *Schiff.*

Noctua ypsilon, Wien. Verz. 78.
Orthosia upsilon, Staint. Man. i. 246.

Both local and rare in most districts of the two counties, except at Exeter, where, Mr. Parfitt says, it is common

Loc.—Bickleigh, *J. S. D.;* Teignmouth, *Dr. J.;* Exeter, *E. P.*

266. **O. lota,** *Lin.*

Pha-Bombyx lota, Lin. Sys. Nat. ii. 830.
Orthosia lota, West. & Hum. Brit. Moth. i. 137, pl. 28, fig. 9.—Staint. Man. i. 246.

Common.

App.—September and October.

Loc.—Bickleigh ; Ivybridge ; Radford-wood ; Wembury ; Anthony ;—Torquay, *Dr. J.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Barnstaple, *G. F. M.*

267. **O. macilenta,** *Hüb.*

Noctua macilenta, Hüb. Noct. pl. 89, fig. 418.
Orthosia macilenta, West. & Hum. Brit. Moth. i. 140, pl. 28, fig. 9.—Staint. Man. i. 246.

Common.

App.—September and October.

Loc.—Same as given for *O. lota.*

Gen. **ANCHOCELIS,** *Doub.*

268. **A. rufina,** *Lin.*

Pha-Bombyx rufina, Lin. Sys. Nat. ii. 830.
Orbona rufina, West. & Hum. Brit. Moth. i. 211, pl. 45, fig. 11-12.
Anchocelis rufina, Staint. Man. i. 247.

Common but local. It comes freely to "sugar."

App.—September.

Loc.—Ivybridge; Bickleigh-vale; — Torquay, *Dr. B.;* Exeter, *E. P.;* Barnstaple, *G. F. M.*

269. **A. pistacina,** *Schiff.*

Noctua pistacina, Schiff. Wien. Verz. 77.
Orthosia pistacina, West. & Hum. Brit. Moth. i. 138, pl. 28, fig. 5-8.
Anchocelis pistacina, Staint. Man. i. 247.

Common.

App.—September.

Loc.—Same as for *A. rufina.*

270. **A. lunosa,** *Haw.*

Noctua lunosa, Haw. Lep. Brit. 230.
Orthosia humilis, West. & Hum. Brit. Moth. i. 139, pl. 27, fig. 7-8.
Anchocelis lunosa, Staint. Man. i. 248.

Common.

App.—September (some seasons, from late in August until early in October).

Loc.—Same as given for the two species directly above.

271. **A. litura,** *Lin.*

Pha-Noctua litura, Lin. Sys. Nat. ii. 858.
Orthosia litura, West. & Hum. Brit. Moth. i. 138, pl. 28, fig. 4.
Anchocelis litura, Staint. Man. i. 248.

In the vicinity of Plymouth it has not been observed; and it approaches westward no farther than Totnes, where one specimen only was procured. At Exeter and Alphington it is, however, not unfrequent; Mr. Parfitt having taken it at the former place, and Mr. Dorville at the latter.

Gen. **CERASTIS,** *Och.*

272. **C. Vaccinii,** *Lin.*

Pha-Noctua Vaccinii, Lin. Sys. Nat. ii. 852.
Glæa Vaccinii, West. & Hum. Brit. Moth. i. 149, pl. 30, fig. 7-8.
Cerastis Vaccinii, Staint. Man. i. 249.

Very common.

App.—October and November, and again in early spring, usually during February and March.

Loc.—Plymouth ; Bickleigh-vale ; Tavistock ; Ivybridge ; Wembury ;—Torquay, *R. B. R.* ; Teignmouth, *Dr. J.* ; Exeter, *E. P.* ; Alphington, *H. D.* ; Barnstaple, *G. F. M.*

273. **C. spadicea,** *Schiff.*

Noctua spadicea, Schiff. Wien. Verz. 86.
Glæa subnigra, West. & Hum. Brit. Moth. i. 149, pl. 30, fig. 7-8.
Cerastis spadicea, Staint. Man. i. 249.

Not so common as *C. Vaccinii.*

The species, in this district of England, affords the usual complement of varieties.

274. **C. erythrocephala,** *Schiff.*

Noctua erythrocephala, Schiff. Wien. Verz. 77.
Cerastis erythrocephala, Staint. Man. i. 249.

Very rare. (*Unique* in Devon and Cornwall.)

App.—November (the 5th).

Loc.—Ivybridge (at "sugar.")

Few local catalogues of Lepidoptera contain the three *Cerastes.* The Devonian and Cornish *Fauna* is, therefore, in this respect, rich. The smaller species (*C. Vaccinii* and *C. spadicea*) are both common moths ; and the rare *C. erythrocephala* was added to the list of local insects in 1856, when one was obtained at Ivybridge : no other, since that time, has been observed either in Devon or Cornwall.

This moth was discovered to be British in 1847, when one example only was procured, which remained unique during nine years, until the second specimen was captured in Devonshire.

Gen. **SCOPELOSOMA,** *Curt.*

275. **S. satellitia,** *Lin.*

Pha-Noctua satellitia, Lin. Sys. Nat. ii. 855.
Mecoptera satellitia, West. & Hum. Brit. Moth. i. 150, pl. 30, fig. 9.
Scopelosoma satellitia, Staint. Man. i. 250.

Frequent, but not common.

App.—November, and again in spring.

Loc.—Plymouth ; Anthony ; Ivybridge ; — Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Barnstaple, *G. F. M.*

Gen **DASYCAMPA,** *Gn.*

276. **D. rubiginea,** *Schiff.*

Noctua rubiginea, Schiff. Wien. Verz. 86.

Dasycampa rubiginea, West. & Hum. Brit. Moth. i. 148, pl. 30, fig. 3-4.—Staint. Man. i. 250.

Rare.

App.—October and November, and hybernated individuals recur again in spring—generally in March and April.

Loc.—Plymouth ; Bickleigh ; — Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

Gen. **HOPORINA,** *Boid.*

277. **H. croceago,** *Schiff.*

Noctua croceago, Schiff. Wien. Verz. 86.

Xantholeuca croceago, West. & Hum. Brit. Moth. i. 211, pl. 45, fig. 9-10.

Hoporina croceago, Staint. Man. i. 251.

Infrequent, though in particular seasons common.

App.—September, October, and November ; and the second appearance during March and April.

Loc.—Plymouth (gardens) ; Ivybridge ; Bickleigh ;—Devonport, *J. S. D.;* Exeter, *E. P.;* Barnstaple, *G. F. M.*

Gen. **XANTHIA,** *Och.*

278. **X. citrago,** *Lin.*

Pha-Noctua citrago, Lin. Sys. Nat. ii. 857.

Xanthia citrago, West. & Hum. Brit. Moth. i. 210, pl. 45, fig. 7-8.—Staint. Man. i. 252.

Common at Torquay and Barnstaple ; rare in the neighbourhood of Plymouth.

App.—September.

Loc.—Wembury ;—Torquay, *R. B. R.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

279. **X. cerago,** *Schiff.*

Noctua cerago, Schiff. Wien. Verz. 87.

Xanthia fulvago, West. & Hun. Brit. Moth. i. 209, pl. 49, fig. 2-4.

Xanthia cerago, Staint. Man. i. 252.

Not common.

App.—September.

Loc.—Plympton; Bickleigh-vale; Ivybridge;—Cornwood, *J.S.D.;* Alphington, *H. D.*

280. **X. flavago,** *Fab.*

Noctua flavago, Fab. Mant. ii. 260.

Noctua silago, Hüb. Noct. pl. 40, fig. 191.

Xanthia flavago, West. & Hum. Brit. Moth. i. 209, pl. 45, fig. 1-2.—Staint. Man. i. 252.

Not common.

App.—September.

Loc.—Ivybridge; Shaugh-bridge;—Brent, *J. S. D.;* Torquay, *R. B. R., Dr. B.;* Barnstaple, *G. F. M.*

281. **X. aurago,** *Schiff.*

Noctua aurago, Schiff. Wien. Verz. 86.

Xanthia aurago, West. & Hum. Brit. Moth. i. 210, pl. 45, fig. 5.—Staint. Man. i. 253.

Rare and local.

App.—

Loc.—Torquay, *Dr. B.;* Teignmouth, *Dr. J.*

282. **X. ferruginea,** *Schiff.*

Noctua ferruginea, Schiff. Wien. Verz. 86.

Orbona ferruginea, West. & Hum. Brit. Moth. i. 212, pl. 45, fig. 13.

Xanthia ferruginea, Staint. Man. i. 253.

Generally distributed and common.

App.—September.

Loc.—Truro; St. Germans; Plymouth; Ivybridge;—Torquay, *R. B. R.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Barnstaple, *G. F. M.*

Gen. **CIRRŒDIA,** *Gn.*

283. **C. xerampelina,** *Hüb.*

Noctua xerampelina, Hüb. Noct. pl. 90, fig. 421.

Cirrœdia xerampelina, Staint. Man. i. 254.

Rare. Has occurred in only two districts of the area over which this Catalogue is a record.

App.—

Loc.—" Between Bickleigh and Plympton Station," *J. S. D.*; Torquay, *Dr. B.*

FAMILY—COSMIDÆ, *Gn.*

Gen. **TETHEA,** *Och.*

284. **T. subtusa,** *Schiff.*

Noctua subtusa, Schiff. Wien. Verz. 88.
Plastenis subtusa, West. & Hum. Brit. Moth. i. 205, pl. 44, fig. 1-4.
Tethea subtusa, Staint. Man. i. 256.

Infrequent.

Loc.—Bolthead;—Torquay, *Dr. B.*; Teignmouth, *Dr. J.*; Exeter, *E. P.*

285. **T. retusa,** *Lin.*

Pha-Noctua retusa, Lin. Sys. Nat. ii. 858.
Plastenis retusa, West. & Hum. Brit. Moth. i. 205, pl. 44, fig. 2-3.
Tethea retusa, Staint. Man. i. 256.

Is taken at Exeter, according to Mr. Parfitt; and also at Alphington, on the authority of Mr. Dorville.

Gen. **COSMIA,** *Och.*

286. **C. trapezina,** *Lin.*

Pha-Noctua trapetzina, Lin. Sys. Nat. ii. 836.
Cosmia trapetzina, West. & Hum. Brit. Moth. i. 207, pl. 44, fig. 13.
Cosmia trapezina, Staint. Man. i. 258.

Frequent, and in some districts common.

App.—July and August.

Loc.—Plymouth; Whitsands; Looe; St. Germans; Totnes;—Torquay, *Dr. B.*; Teignmouth, *Dr. J.*; Exeter, *E. P.*; Alphington, *H. D.*

287. **C. pyralina,** *Schiff.*

Noctua pyralina, Schiff. Wien. Verz. 88.
Cosmia pyralina, West. & Hum. Brit. Moth. i. 207, pl. 44, fig. 8-9.—Staint. Man. i. 258.

App.—

Loc.—Occurs at Alphington, where it is taken by Mr. Dorville; and also at Modbury, according to the Rev. G. C. Green, where the species is common.

288. **C. diffinis,** *Lin.*

Pha-Noctua diffinis, Lin. Sys. Nat. ii. 848.

Cosmia diffinis, West. & Hum. Brit. Moth. i. 207, pl. 44, fig. 10.—Staint. Man. i. 258.

Not common.

App.—July and August.

Loc.—Tothill-lane, Woodside, Knackersknowle, Plymouth;—Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.*

289. **C. affinis,** *Lin.*

Pha-Noctua affinis, Lin. Sys. Nat. ii. 848.

Cosmia affinis, West. & Hum. Brit. Moth. i. 207, pl. 44, fig. 12.—Staint. Man. i. 259.

More frequent than *C. diffinis*, but not common.

App.—July and August.

Loc.—Woodside, Hoe, Plymouth; Devil's-point, Stonehouse; Maker; Anthony; Looe; Tavistock;—Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

FAMILY—HADENIDÆ, *Gn.*

Gen. **DIANTHŒCIA,** *Boid.*

290. **D. carpophaga,** *Bork.*

Pha-Noctua carpophaga, Bork. Europ. Smett. iv. 242.

Hadena (?) ochracea, West. & Hum. Brit. Moth. i. 165, pl. 34, fig 1.

Dianthæcia carpophaga, Staint. Man. i. 261.

Rare.

App.—July.

Loc.—Citadel, Plymouth;—Whitsands, *R. B. R.*, *J. S. D.;* Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Alphington, *H. D.*

291. **D. capsincola,** *Schiff.*

Noctua capsincola, Schiff. Wien. Verz. 84.

Hadena (?) capsincola, West. & Hum. Brit. Moth. i. 167, pl. 34, fig. 7-10.

Dianthæcia capsincola, Staint. Man. i. 261.

Not uncommon, but local.

App.—

Loc.—Bovisand; Wembury; Whitsands; Cremill; Beerferris;—Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.;* Falmouth, *Faun. Fal.*

292. **D. Cucubali,** *Schiff.*

Noctua Cucubali, Schiff. Wien. Verz. 84.
Hadena Cucubali, West. & Hum. Brit. Moth. i. 167, pl. 34, fig. 5-6.
Dianthæcia Cucubali, Staint. Man. i. 262.

Not uncommon, but local.

App.—June (occasionally in July).

Loc.—Bovisand; Whitsands; Devil's-point; Plymouth Hoe;—Torquay, *Dr. B.;* Ashburton, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.;* Falmouth, *Faun. Fal.*

293. **D. conspersa,** *Schiff.*

Noctua conspersa, Schiff. Wien. Verz. 71.
Miselia compta, West. & Hum. Brit. Moth. i. 187, pl. 39, fig. 15.
Dianthæcia conspersa, Staint. Man. i. 262.

Rare and local.

Loc.—Bolthead;—Whitsands, *J. S. D.;* Torquay, *Mr. J. Buckton;* Teignmouth, *H. D.*

Gen. **HECATERA.**

294. **H. serena,** *Schiff.*

Noctua serena, Schiff. Wien. Verz. 84.
Polia serena, West. & Hum. Brit. Moth. i. 192, pl. 40, fig. 13.
Hecatera serena, Staint. Man. i. 263.

Not uncommon. The *larvæ* are found plentifully, late in summer, on the Corn Sow-thistle *(Sonchus arvensis)*, and also on the common Sow-thistle *(Sonchus oleraceus)*. The *imago* is found on walls, the combined colouring of which, consisting of stone, mortar, lichens, together with the toning down, represents a very near approach to the colour of this insect;—thus, the two objects being somewhat of the same shade, neither is easily distinguished from the other, and the insect is not easily observed.

App.—July (some seasons, in June).

Loc.—Looe; Whitsand-cliffs; Cremill; Staddon-heights; Wembury;—Salcombe, *Mr. J. Buckton;* Torquay, *Dr. B.;* Teignmouth, *Dr. J.*

Gen. **POLIA,** *Och.*

295. **P. Chi,** *Lin.*

Pha-Noctua Chi, Lin. Sys. Nat. ii. 846.

Polia Chi, West. & Hum. Brit. Moth. i. 192, pl. 40, fig. 15.—Staint. Man. i. 264.

Much rarer than the species immediately preceding.

App.—August.

Loc.—Plymouth, *R. B. R.;* Torquay. *Dr. B.;* Teignmouth, *Dr. J.;* Modbury, *Rev. G. C. Green.*

296. **P. flavocincta,** *Schiff.*

Noctua flavicincta, Schiff. Wien. Verz. 72.

Polia flavicincta, West. & Hum. Brit. Moth. i. 191, pl. 40, fig. 9.

Polia flavocincta, Staint. Man. i. 264.

This insect appears to be very local. It is, however, a common species in the neighbourhood surrounding Plymouth, where the moth is taken freely, both at "sugar" and at gas-lamps. Dr. Jordan too finds it commonly at Teignmouth.

App.—September.

Loc.—Plymouth;—Torquay, *Dr. B.;* Teignmouth, *Dr. J.*

Gen. **DASYPOLIA,** *Gn.*

297. **D. Templi,** *Thunb.*

Noctua Templi, Thunb. Insec. Suec. iv. 56.

Polia Templi, West. & Hum. Brit. Moth. i. pl. 39, fig. 11.

Dasypolia Templi, Staint. Man. i. 265.

Not uncommon in the suburban districts, and even in the town of Plymouth. It is greatly affected and allured by artificial light.

App.—October and particularly in November. A few notes of dates of capture run thus:—"November 8th, 16th, 18th, and 25th."

Loc.—Plymouth;—Keyham, Devonport, *J. S. D.;* Torquay, *Dr. B.;* Teignmouth, *Dr. J.*

Gen. **EPUNDA,** *Dup.*

298. **E. lutulenta,** *Schiff.*

Noctua lutulenta, Schiff. Wien. Verz. 81.
Charæas fusca, West. & Hum. Brit. Moth. i. 112, pl. 22, fig. 6.
Epunda lutulenta, Staint. Man. i. 266.

Rare. A local species, though not rare in the *larval* state.

Loc.—Plymouth; Whitsands; Staddon-heights; — Devonport, *J. S. D.;* Torquay, *R. B. R.;* Teignmouth, *Dr. J.;* Alphington, *H. D.*

299. **E. nigra,** *Haw.*

Noctua nigra, Haw. Lep. Brit. 192, 89.
Charæas nigra, West. & Hum. Brit. Moth. i. 112.
Epunda nigra, Staint. Man. i. 266.

Not uncommon. Taken in woods, by "sugaring."

App.—September.

Loc.—Plym-bridge; Ivybridge; Totnes; Kingsbridge; St. Germans;—Road to Saltash, *J. S. D.;* Torquay, *Dr. B.;* Teignmouth, Alphington, *H. D.*

300. **E. viminalis,** *Fab.*

Noctua viminalis, Fab. Gen. Insect. Mant. 284.—Mantissa, 158, No. 160.
Cleoceris viminalis, West. & Hum. Brit. Moth. i. 206, pl. 44, fig. 5.
Epunda viminalis, Staint. Man. i. 266.

Rare.

App.—July.

Loc.—Plym-bridge; Shaugh-bridge; Ivybridge; — Woods near Ashburton, *Dr. J.;* Alphington, *H. D.;* Road from Devonport to Saltash, *J. S. D.*

Larva found on buds of White-thorn, *J. S. D.*

301. **E. lichenea,** *Hüb.*

Eumichtis lichenea, Hüb. Noct. fig. 562-3.
Epunda lichenea, Staint. Man. i. 266.

A common autumnal species in and around Plymouth.

App.—September and October.

Loc.—In gardens and street-lamps, Woodside, North-hill, Hoe, Plymouth; Crabtree; Plym-bridge; Tavistock;—Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Alphington, *H. D.*

Gen. **MISELIA,** *Och.*

302. **M. Oxyacanthæ,** *Lin.*

Pha-Noctua Oxycanthæ, Sys. Nat. ii. 852.

Miselia Oxyacanthæ, West. & Hum. Brit. Moth. pl. 39, fig. 12.—Staint. Man. i. 268.

Common.

App.—October and November.

Loc.—Plymouth, and every wood twenty miles round;—Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Barnstaple, *G. F. M.*

Gen. **AGRIOPIS,** *Boid.*

303. **A. Aprilina,** *Lin.*

Pha-Noctua Aprilina, Lin. Sys. Nat. ii. 847.

Miselia Aprilina, West. & Hum. Brit. Moth. i. 107, pl. 39, fig. 13.

Agriopis Aprilina, Staint. Man. i. 268.

Common.

App.—September and October.

Loc.—Same as given for *M. Oxyacanthæ.*

Gen. **PHLOGOPHORA,** *Och.*

304. **P. meticulosa,** *Lin.*

Pha-Noctua meticulosa, Lin. Sys. Nat. ii. 845.

Phlogophora meticulosa, West. & Hum. Brit. Moth. i. 221, pl. 48, fig. 5-6.—Staint. Man. i. 269.

Very common everywhere.

App.—Early in summer, and again in autumn.

Gen. **EUPLEXIA,** *Steph.*

305. **E. lucipara,** *Lin.*

Pha-Noctua lucipara, Lin. Sys. Nat. ii. 857.

Euplexia lucipara, West. & Hum. Brit. Moth. i. pl. 35, fig. 4.—Staint. Man. i. 270.

Common in gardens, fields, lanes, and woods.

App.—July.

Loc.—Plymouth; — Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Barnstaple, *G. F. M.*

Gen. **APLECTA,** *Gn.*

306. **A. herbida,** *Schiff.*

Noctua herbida, Schiff. Wien. Verz. 313.
Polia herbida, West. & Hum. Brit. Moth. i. 190, pl. 40, fig. 7.
Aplecta herbida, Staint. Man. i. 271.

Not unfrequent at "sugar."

App.—August and September.

Loc.—Plymouth; Longbridge; Shaughbridge; Ford, Stoke; Anthony;—Weston Mills, *J. S. D.;* Torquay, *Dr. B.;* Exeter, *E.P.*

Note.—Dr. Jordan writes:—"No *Aplecta* has ever been taken by us at Teignmouth."

307. **A. nebulosa,** *Och.*

Polia nebulosa, Och. iv. 74.
Polia nebulosa, West. & Hum. Brit. Moth. i. 189, pl. 40, fig. 2-3.
Aplecta nebulosa, Staint. Man. i. 272.

Not uncommon. The most frequently observed of the genus.

App.—

Loc.—Same as cited for *A. herbida.*

308. **A tincta,** *Bork.*

Polia tincta, West. & Hum. Brit. Moth. i. 189, pl. 40, fig. 6.
Aplecta tincta, Staint. Man. i. 272.

Rare.

App.—July.

Loc.—Bickleigh vale;—Weston Mills, *J. S. D.*

309. **A. advena,** *Schiff.*

Noctua advena, Schiff. Wien. Verz. 77.
Polia advena, West. & Hum. Brit. Moth. i. 189, pl. 40, fig. 1.
Aplecta advena, Staint. Man. i. 272.

Not uncommon.

App.—July.

Loc.—Same as mentioned for *A. herbida* and *A. nebulosa.*

Gen. **HADENA,** *Och.*

310. **H. adusta,** *Esp.*

Noctua adusta, Esp. Noct. 70, fig. 1.
Hadena adusta, West. & Hum. Brit. Moth. i. 161, pl. 33, fig. i.—Staint. Man. i. 274.

Not common, except at Barnstaple.

App.—July.

Loc.—Bickleigh; Ivybridge; St. Cleer; Anthony;—Devonport, *J. S. D.;* Torquay, *R. B. R.;* Teignmouth, *Dr. J.;* Barn staple, *G. F. M.*

311. **H. protea,** *Schiff.*

Noctua protea, Schiff. Wien. Verz. 84.

Hadena protea, West. & Hum. Brit. Moth. i. 166, pl. 34, fig. 3-4.—Staint. Man. i. 275.

Common in Devon and Cornwall.

App.—September.

Loc.—Plymouth; Bickleigh; Ivybridge;—Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Barnstaple, *G. F. M.;* Falmouth, *Faun. Fal.*

312. **H. Dentina,** *Schiff.*

Noctua Dentina, Schiff. Wien. Verz. 82.

Hadena plebeia, West. & Hum. Brit. Moth. i. 164, pl. 33, fig. 9-10.

Hadena dentina, Staint. Man. i. 275.

Not uncommon both in Devon and Cornwall.

App.—

Loc.—Plymouth; Millbrook; St. Germans; Kingsbridge-road; —Falmouth, *Faun. Fal.*; Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

313. **H. Chenopodii,** *Schiff.*

Noctua Chenopodii, Schiff. Wien. Verz. 82.

Mamestra Chenopodii, West. & Hum. Brit. Moth. i. 175, pl. 36, fig. 13.

Hadena Chenopodii, Staint. Man. i. 275.

Rare and local.

App.—July.

Loc.—Longbridge;—one at Millbrook, *J. S. D.;* Barnstaple, *G. F. M.*

314. **H. oleracea,** *Lin.*

Pha-Noctua oleracea, Lin. Sys. Nat. ii. 853.

Mamestra oleracea, West. & Hum. Brit. Moth. i. 173, pl. 36, fig. 4-5.

Hadena oleracea, Staint. Man. i. 277.

A very common species.

App.—June. (Some seasons May.)

315. **H. Pisi,** *Lin.*

Pha-Noctua Pisi, Lin. Sys. Nat. ii. 854.
Mamestra Pisi, West. & Hum. Brit. Moth. i. 172, pl. 36, fig. 2-3.
Hadena Pisi, Staint. Man. i. 277.

Common.

App.—June.

Loc.—Gardens, Plymouth; woods, Bickleigh; slopes of the Tors, Dartmoor;—Torquay, *R. B. R.;* Haldon, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

316. **H. thalassina,** *Nat.*

Noctua thalassina, Der Naturf.
Hadena thalassina, West. & Hum. Brit. Moth. i. 162, pl. 33, fig. 5-6.—Staint. Man i. 277.

Not plentiful, but generally distributed.

App—August.

Loc.—Woodside, Embankment, Plymouth; Plymbridge; Brent; Millbrook; St. Cleer;—Falmouth, *Faun. Fal.;* Keyham, *J. S. D.;* Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

317. **H. contigua,** *Schiff.*

Noctua contigua, Schiff. Wien. Verz. 82.
Hadena contigua, West. & Hum. Brit. Moth. i. 163, pl. 33, fig. 5-6.—Staint. Man. i. 277.

Rare and local.

Loc.—Exeter, *E. P.;* Alphington, *H. D.*

318. **H. W-latinum,** *Huf.*

Pha-Noctua W-latinum, Berl. Mag.
Pha-Noctua Genistæ, Bork. Europ. Schmett.
Hadena Genistæ, West. & Hum. Brit. Moth. i. 163, pl. 33, fig. 5-6.
Hadena W-latinum, Staint. Man. i. 278.

Rare.

App.—June.

Loc.—Embankment, Mutley, Plymouth;—Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Barnstaple, *G. F. M.*

FAMILY.—XYLINIDÆ, *Gn.*

Gen. **XYLOCAMPA,** *Gn.*

319. **X. lithorhiza,** *Bork.*

Pha-Noctua Lithorhiza, Bork. Europ. Schmett.
Hadena lithorhiza, West. & Hum. Brit. Moth. i. 165, pl. 34, fig. 2.
Xylocampa lithorhiza, Staint. Man. i. 280.

Not uncommon.

App.—March and April.

Loc.—Plymouth; Mount Edgcumbe; Anthony; Saltram; Plymbridge; Cornwood; Kingsbridge-road; — Falmouth, *Faun. Fal.*; Milehouse, *J. S. D.*; Torquay, *Dr. B.*; Teignmouth, *Dr. J.*; Exeter, *E. P.*; Alphington, *H. D.*; Barnstaple, *G. F. M.*

Gen. **CLOANTHA,** *Boid.*

320. **C. Solidaginis,** *Hüb.*

Noctua Solidaginis, Hüb. Noct. pl. 53, fig. 256.
Lithomia Solidaginis, West. & Hum. Brit. Moth. 157, pl. 31, fig. 8.
Cloantha Solidaginis, Staint. Man. i. 283.

Only taken by Lieut. Reed, 12th Regt., who took it while "sugaring," at Torquay.

Gen. **CALOCAMPA,** *Steph.*

321. **C. vetusta,** *Hüb.*

Noctua vetusta, Hüb. Noct. pl. 97.
Calocampa vetusta, West. & Hum. Brit. Moth. pl. 31, fig. 11-12.
Calocampa vetusta, Staint. Man. i. 282.

Not common. Comes to "sugar."

App.—September.

Loc.—Stoke; Longbridge; St. Germans;—Devonport, *J. S. D.*; Teignmouth, *Dr. J.*; Alphington, *H. D.*

322. **C. exoleta,** *Lin.*

Pha-Noctua exoleta, Lin. Sys. Nat. ii. 849.
Calocampa exoleta, West. & Hum. Brit. Moth. pl. 31, fig. 9-10.
Calocampa exoleta, Staint. Man. i. 282.

Not uncommon.

App.—September—November.

Loc.—Ford, Devonport; Millbrook; Anthony; Radford-wood; Ivybridge;—Torquay, *Dr. B.;* Exeter, *E. P.*; Alphington, *H. D.;* Barnstaple, *G. F. M.*

Gen. **XYLINA,** *Och.*

323. **X. rhizolitha,** *Schiff.*

Noctua rhizolitha, Schiff. Wien. Verz. 75.
Xylina Lambda, West. & Hum. Brit. Moth. i. 153, pl. 31, fig. 6.
Xylina rhizolitha, Staint. Man. i. 283.

Not uncommon. To be found resting, in the daytime, on trunks of trees in woods. It is taken commonly at "sugar."

App.—Autumn, and again in spring.

Loc.—Mount Edgcumbe; Bickleigh-vale; Ivybridge; Tavistock;—Falmouth, *Faun. Fal.;* Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

324. **X. semibrunnea,** *Haw.*

Noctua semibrunnea, Haw. Lep. Brit. 171.
Xylina semibrunnea, West. & Hum. Brit. Moth. pl. 31, fig. 3.
Xylina semibrunnea, Staint. Man. i. 283.

Rare. Comes to "sugar," and blossoms of ivy.

App.—September and October.

Loc.—Bickleigh-vale; Brent;—Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

325. **X. petrificata,** *Schiff.*

Noctua petrificata, Schiff. Wien. Verz. 75.
Xylina petrificata, West. & Hum. Brit. Moth. 155, pl. 31, fig. 4.
Xylina petrificata, Staint. Man. i. 283.

Not uncommon. Comes to "sugar" and ivy blossoms. Autumn, and again in spring.

App.—September and October; and supposed hybernated specimens are observed in early part of March.

Loc.—Plymouth; Radford wood; Bickleigh vale; Ivybridge;—Shaugh, *J. S. D.;* Torquay, *R. B. R.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

Gen. **CUCULLIA,** *Och.*

326. **C. Verbasci,** *Lin.*

Pha-Noctua Verbasci, Lin. Sys. Nat. 850.

Cucullia Verbasci, West. & Hum. Brit. Moth. i. 221, pl. 48, fig. 7.—Staint. Man. i. 285.

Common.

App.—During May, throughout Devon and Cornwall.

NOTE.—Mr. Mathew writes:—"The extreme abundance of the larvæ of this species on Braunton Burrows, in the summers of 1858, '59, and '60, is worth mentioning. Every plant of *Verbascum Thapsus* was completely covered with them; the larvæ in July varying in size from the juvenile just hatched, to the full-fed individual ready to burrow in the sand. I am positive that had any one desired to have taken ten or twenty thousand, it might easily have been done."

327. **C. Scrophulariæ,** *Schiff.*

Noctua Scrophulariæ, Schiff. Wien. Verz. 312.

Cucullia Scrophulariæ, West. & Hum. Brit. Moth. i. 222, pl. 48, fig. 9.

Phalæna Verbasci, Don. Brit. Insect.

Cucullia Scrophulariæ, Staint. Man. i. 285.

Rare.

In comparing a series of so-called *Scrophulariæ* with similar variations of *Verbasci*, it soon becomes a hopeless task to separate them. There appears little doubt but that only one species is a native of the two western counties. *Larvæ* are found on the different food plants mentioned by authors, on which both species are supposed exclusively to feed, but these *larvæ* graduate by variations into one another.

The imagos found in most southern as well as in northern, cabinets, representing *Scrophulariæ*, possess no more marked characteristics of distinctness than do those in collections in western England; *Scrophulariæ* being in Mr. Doubleday's later edition of "Synonymic List of British Lepidoptera," is the strongest argument that it is an indigenous insect.

App.—Same time as *Verbasci.*

Loc.—Plymouth;—Devonport, *J. S. D.*; Teignmouth, *Dr. J.*; Exeter, *E. P.*; Barnstaple, *G. F. M.* (the *larvæ* only).

Larva on Wood Betony.—*J. S. D.*

328. **C. Absinthii,** *Lin.*

Pha-Noctua Absinthii, Lin. Sys. Nat. ii. 845.
Cucullia Absinthii, West. & Hum. Brit. Moth. i. 225, pl. 49, fig. 5.—Staint. Man. i. 286.

Rare.

App.—July.

For this rare and very distinct insect there are, in Devon and Cornwall, three widely separated districts in which it is found. In 1855-6 the *larva* was found near Wembury, feeding on wormwood; Dr. Cocks records it as occurring at Falmouth; and Mr. Dorville, by cultivating the food plant, has been enabled to procure the species at Alphington.

329. **C. Chamomillæ,** *Schiff.*

Noctua Chamomillæ, Schiff. Wien. Verz. 73.
Cucullia Chamomillæ, West. & Hum. Brit. Moth. i. 226, pl. 49, fig. 14.—Staint. Man. i. 287.

Common, but very local.

App.—Spring, (according to season).

Loc.—Neighbourhood of Plymouth.

The *larva* is found abundantly on *Pyrethrum inodorum* and *maritimum*, but not on *Anthemis* nor *Matricaria*. The chief habitats are the semi-marine shores and wastes bordering Plymouth Sound, and the estuaries of the Yealm, Plym, Tamar, and the Lynher.

330. **C. umbratica,** *Lin.*

Pha-Noctua umbratica, Lin. Sys. Nat. ii. 849.
Cucullia umbratica, West. & Hum. Brit. Moth. i. 225, pl. 49, fig. 6.—Staint. Man. i. 287.

Generally distributed, but not common.

App.—June.

Loc.—Plymouth; Saltash; Beerferris; Shaugh; Kingsbridge-road;—Falmouth, ***Faun. Fal.***; Torquay, *Dr. B.*; Teignmouth *Dr. J.*; Exeter, *E. P.*; Alphington, *H. D*; Barnstaple, *G. F. M.*

FAMILY.—HELIOTHIDÆ, *Gn.*

Gen. **HELIOTHIS,** *Och.*

331. **H. marginata,** *Fab.*

Noctua marginata, Fab. Ent. Sys.—Mant. 166.

Heliothis marginata, West. & Hum. Brit. Moth. i. 236, pl. 53, fig. 1.—Staint. Man. i. 291.

Local, and not uncommon. Comes to "sugar," and is also attracted by artificial light.

App.—May—July.

Loc.—Hoe, Plymouth; Bovisand; Whitsand-heights; Cremill; —Torquay, *Dr. B.;* Teignmouth, *Dr. J.*

The *larva* is very common in some localities during the latter part of summer, feeding on *Ononis.*

332. **H. peltigera,** *Schiff.*

Noctua peltigera, Schiff. Wien. Verz.

Heliothis peltigera, West. & Hum. Brit. Moth. 236, pl. 53, fig. 2.—Staint. Man. i. 291.

More frequent on the coast than inland. Has a wide range coastwise in the two westernmost counties. So uncertain however are the seasons of its occurrence, that it might with propriety be termed either very common or very rare.

In the years 1853-'4 the *larvæ* of this insect were found in great abundance in most of the bays that skirt the coast, from Looe Island to Berryhead;—many patches of *Ononis* var. *spinosa,* covering an area of not more than two feet superficial, yielding as many as 300 *larvæ.* More than a thousand were collected, and many left in all likelihood to the number of thousands. It appeared thus plentifully during the two seasons mentioned; but since those periods the insect in any stage, has not been observed in numbers that would warrant its being considered common. Indeed, throughout whole seasons not one specimen falls to the share of even the industrious Lepidopterist.

The *larvæ* vary considerably in colour. As many variations are to be seen in this as are met with in its congener *H. marginata.* The two forms described below are those usually found.

Larva No. 1.—Deep green; scattered short bristly hairs; dorsal, subdorsal, longitudinal, and transverse lines deeper; spiracles, spiracular line and scattered spots, white.

Larva No. 2.—Same markings as in No. I.; but the whole ground colour is chromish red, inclining to pink.

The *larva* No. 2. is found feeding upon the bright petals of *Ononis spinosa*, the hue of which is shed through the transparent skin of the caterpillar; whilst No. 2 feeds on the leaves and seeds of one or more of its food plants.

Food plants of the *larvæ* are :—

Ononis spinosa and *arvensis* (merely two forms of one species). Occurs commonly along the coast, as well as inland.

Arenaria rubra, a common rock plant.

Hyoscyamus niger, Whitsand-cliffs.

Pyrethrum inodorum and *maritimum* (both being forms of one plant). Common on the coast and near thereto. *Larvæ* feed on the anthers of this plant, like those of *Polia serena* on a similar part of a *Sonchus*. The *larvæ* on *Pyrethrum* are yellowish-green, the yellow anthers imparting some of the colouring matter, with which they are charged, to the caterpillar; whilst the pollen gives a stronger tinge of the same to the external covering, by adhering to the hairs of the insect.

Full-grown *larvæ* are found in the beginning of August, but partially-grown are to be obtained from as early as May,

App.—September, and in spring and summer. Not double-brooded, but semi-brooded twice a year; one portion coming forth soon after the completion of the pupa condition, and the other portion, or part of it, remaining in the pupal state till the next season; whilst sometimes it happens that a few keep to the pupal covering for one, two, and even three years.

Loc.—East Looe; Whitsands; Cremill; Hoe; Batten; Bovisand; Wembury; Bigbury Bay; Slapton Sands; Berry Head; —Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Alphington, "at sugar," *H. D.;* Exmouth Warren, *E. P.*

333. **H. armigera** *Hüb.*

Noctua armigera, Hüb. Noct. pl. 79, fig. 370.
Heliothis armigera, Staint. Man. i. 291.

Rare, but generally distributed. Observed usually on the wing in daytime. It however frequents the sweetened bait of the nocturnal lepidopterist.

App.—September and October.

Loc.—Hoe, Plymouth ; — Teignmouth, *Dr. J.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

334. **H. dipsacea,** *Lin.*

Pha-Noctua dipsacea, Lin. Sys. Nat. ii. 856.
Heliothis dipsacea, West. & Hum. Brit. Moth. 236, pl. 53. fig. 4.—Staint. Man. i. 292.

Only known to inhabit one locality throughout the whole extent of the two counties.

Loc.—" Near the wood, Trefusis, July, 1846," *Faun. Fal.*

Gen. **ANARTA,** *Och.*

335. **A. Myrtilli,** *Lin.*

Pha-Noctua Myrtilli, Lin. Sys. Nat. ii. 863.
Anarta Myrtilli, West. & Hum. Brit. Moth. i. 237, pl. 53, fig. 7.—Staint. Man. i. 293.

Local and scarce.

App.—June.

Loc.—Bickleigh-down ; Brent hill, near Tavistock ; St. Cleerdown;—Falmouth, *Faun. Fal.;* Torquay, *R. B. R.;* Haldon, *Dr. J.*

Gen. **HELIODES,** *Gn.*

336. **H. Arbuti,** *Fab.*

Noctua Arbuti, Fab. Ent. Sys.—Mant. ii. 184.
Heliodes heliaca, West. & Hum. Brit. Moth. i. 238, pl. 53, fig. 10.
Heliodes Arbuti, Staint. Man. i. 294.

Not uncommon.

App.—May and June.

Loc.—East Looe ; Ramehead ; Wembury ; Bickleigh ; Brent ; —Stoke, *J. S. D.;* Falmouth, *Faun. Fal.;* Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

SECTION.—MINORES.

FAMILY.—ACONTIDÆ, *Gn.*

Gen. **ACONTIA,** *Och.*

337. **A. luctuosa,** *Schiff.*

Noctua luctuosa, Schiff. Wien. Verz. 90.

Acontia luctuosa, West. & Hum. Brit. Moth. 238, pl. 53, fig. 11.—Staint. Man. i. 297.

Common, but local.

App.—May and August.

Loc.—Torquay, where Dr. Battersby obtained it in profusion, and since by numerous other collectors. It has also been taken at Exmouth, by Dr. Jordan.

FAMILY.—ERASTRIDÆ, *Gn.*

Gen. **ERASTRIA,** *Och.*

338. **E. fuscula,** *Schiff.*

Noctua fuscula, Schiff. Wien. Verz.

Erastria fuscula, West. & Hum. Brit. Moth. i. 240, pl. 53, fig. 23-4.—Staint. Man. i. 298.

Generally distributed, and not uncommon.

App.—June.

Loc.—Saltram; Bickleigh-vale; Kingsbridge;—Upland woods, near Ashburton, *Dr. J.*; Torquay, *Dr. B.*; Fordlands, *H. D.*; Barnstaple, *G. F. M.*

FAMILY.—ANTHOPHILIDÆ, *Gn.*

Gen. **HYDRELIA,** *Gn.*

339. **H. uncana,** *Lin.*

Pha-Tortrix uncana, Lin. Sys. Nat. ii. 875.

Erastria uncana, West. & Hum. Brit. Moth. 241, pl. 53, fig. 15.

Hydrelia uncana, Staint. Man. i. 300.

There are but two localities within the area under notice, where this insect has occurred; one in Cornwall, the other in Devonshire. It is said to be "not uncommon" in the Cornish habitat, and it was certainly most plentiful on Dartmoor. The nature of the place, however, precludes one from obtaining it easily.

Loc.—Bog, near Great Mis Tor, Dartmoor; Falmouth, *Faun Fal.*

Gen. **MICRA,** *Gn*

340 **M. ostrina,** *Hüb.*

Noctua ostrina, Hüb. Noct. pl. 85, fig. 399.
Micra ostrina, West. & Hum. Brit. Moth. i. 243, pl. 53, fig. 21.—Staint. Man. i. 300.

Only at Torquay, where it was taken by Miss Battersby.

App.—June.

341. **M. parva,** (?) *Hüb.*

Exromina parva, Hüb. Noct. pl. 77, fig. 356.
Micra parva, Staint. Ent. Ann. pl. fig. 1, 1859.

First taken, in England, by Dr. Jordan, at Teignmouth, who secured a specimen as it was flying about a lamp. In 1858, Dr. Battersby found a good habitat of this insect at Torquay, where he obtained examples, but the species remains Devonian, and very rare.

App.—June.

NOTE.—There is some doubt whether the *Micra parva* of Hübner's Noctuæ can be identical with the little insect found at Torquay and Teignmouth, and which British Lepidopterists have agreed to consider it.

The insect illustrated under the name of *M. parva* is most certainly not the insect taken in Devonshire; and the description in the same work is too short to be useful, or at least to lead to perfect identification of the species.

The Torquay insect possibly has a good traditional name obtained by comparing it with continental specimens designated "*Micra parva,* Hüb." But, on placing the Devonshire insect by the figure in Hübner's work, it will at once be seen that the markings in the illustration, are opposed to those in the insect.

Perhaps the genus may be revised and monographed by some skilful Lepidopterist acquainted with all the known species; when more than likely our insect will prove to be neither *M. parva* nor *M. minuta*, but a new member of the genus.

GROUP—QUADRIFIDÆ, *Gn.*

SECTION—VARIEGATÆ, *Gn.*

FAMILY—PLUSIDÆ, *Boisd.*

Gen. **ABROSTOLA,** *Och.*

342. **A. urticæ,** *Hüb.*

Noctua urticæ, Hüb. Noct. pl. 137, fig. 625.

Abrostola urticæ, West. & Hum. Brit. Moth. 229, pl. 50, fig. 8-9.—Staint. Man. i. 304.

Not uncommon.

App.—June and July.

Loc.—Plymouth; Millbrook; St. Germans; and almost in every locality;—Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

343. **A. triplasia,** *Lin.*

Pha-Noctua triplasia, Lin. Sys. Nat. ii. 854.

Abrostola triplasia, West. & Hum. Brit. Moth. i. 229, pl. 50, fig. 6-7.—Staint. Man. i. 305.

Not generally common.

App.—July.

Loc.—Plymouth; Crabtree; Plympton;—Torquay, *R. B. R.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

Gen. **PLUSIA,** *Och.*

344. **P. orichalcea,** *Fab.*

Noctua orichalcea, Fab. Sys. Ent.

Plusia orichalcea, West. & Hum. Brit. Moth. 234, pl. 52, fig. 7.—Staint. Man. i. 306.

This beautiful moth was added to the insect fauna of the two counties by E. Lethbridge, who secured an example near Plymbridge. A second specimen was obtained from under the Hoe, Plymouth. Both these insects were captured during the day, and while they were flying from flower to flower.

345. **P. chrysitis,** *Lin.*

Pha-Noctua chrysitis, Lin. Sys. Nat. ii. 843.

Plusia chrysitis, West. & Hum. Brit. Moth. i. 234, pl. 51, fig. 12.—Staint. Man. i. 306.

Generally distributed, but not common.

App.—July.

Loc.—Plymouth; Millbrook; Liskeard; Tavistock; Bickleigh vale;—Torquay, *R. B. R.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Barnstaple, *G. F. M.*

346. **P. Festucæ,** *Lin.*

Pha-Noctua Festucæ, Lin. Sys. Nat. ii. 845.]

Plusia Festucæ, West. & Hum. Brit. Moth. i. 234, pl. 52, fig. 8.—Staint. Man. i. 307, fig.

Generally distributed, but not common.

App.—

Loc.—Embankment, Plymouth; Millbrook;—Falmouth, *Faun. Fal.;* Torquay, *R. B. R.;* Exeter, *E. P.;* Alphington, *H. D.*

347. **P. Iota,** *Lin.*

Pha-Noctua jota, Lin. Sys. Nat. ii. 844.

Plusia percontationis, West. & Hum. Brit. Moth. 231, pl. 51, fig. 4.

Plusia Iota, Staint. Man. i. 307.

Not uncommon, and widely distributed.

App.—

Loc.—Plymouth; Calstock; Liskeard; Cornwood; Bickleigh-bridge;—Falmouth, *Faun. Fal.;* Devonport, *J. S. D.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

348. **P. pulchrina,** (var.) *Haw.*

Plusia V-aureum, Guen. Noct.

Plusia inscripta, Doub. Cat. 1st. ed.—P. *v-aureum,* 2nd. ed.

Plusia pulchrina, Staint. Man. i. 307.

Rather uncommon.

App.—July.

Loc.—Plymouth; Saltash;—Devonport, *J. S. D.;* Teignmouth, *Dr. J.;* Alphington, *H. D.*

349. **P. gamma,** *Lin.*

Pha-Noctua Gamma, Lin. Sys. Nat. ii. 843.

Plusia Gamma, West. & Hum. Brit. Moth. i. 232, pl. 51, fig. 7-8.—Staint. Man. i. 308.

One of our commonest *Noctuæ*, occurring commonly, and frequently in profusion, in every district. It is seen during the day hovering over all kinds of flowers; at night, darting at every kind of light, and paying visits to the "sugar" lure of the Lepidopterist. The caterpillar makes its diet off a large number of very dissimilar plants, and is found everywhere,

App.—May—November.

350. **P. interrogationis,** *Lin.*

Pha-Noctua interrogationis, Faun. Suec.—Sys. Nat. ii. 844.
Plusia interrogationis, West. & Hum. Brit. Moth. i. 235, pl. 51, fig. 6.—Staint. Man. i. 308.

This is included in the list of the *Noctuæ* of Devon and Cornwall, on the authority of two Lepidopterists:—Lieut. R. B. Reed, 12th Regt., who gives Torquay as the locality of his capture; and Mr. J. S. Dell, of Devonport, who reports having taken a specimen near Cann Quarry, Bickleigh-vale.

The occurrence of *P. interrogationis* in the south-west of England will probably cause some surprise to general, as well as to some local Lepidopterists, as it has been hitherto considered exclusively a north of England species. It is admitted into this Catalogue, as two entomologists have recorded its capture; and thus the distrust, that would inevitably have arisen had the insect been noticed by one only, is to a great extent removed.

FAMILY—GONOPTERIDÆ, *Gn.*

Gen. **GONOPTERA,** *Lat.*

351. **G. Libatrix,** *Lin.*

Pha-Bombyx Libatrix, Lin. Sys. Nat. ii. 831.
Gonoptera Libatrix, Staint. Man. i. 309.

Common in and about gardens and outhouses.

App.—August and September; and hybernates till spring, and continues until the end of May. *Larvæ* found on willow and poplar.

Loc.—Throughout Devon and Cornwall.

SECTION—INTRUSÆ, *Gn.*

FAMILY—AMPHIPYRIDÆ, *Gn.*

Gen. **AMPHIPYRA,** *Och.*

523. **A. pyramidea,** *Lin.*

Pha-Noctua pyramidea, Lin. Sys. Nat. ii. 856.
Amphipyra pyramidea, West. & Hum. Brit. Moth. i. 151, pl. 30, fig. 11-12.—Staint. Man. i. 311.

Common. Taken freely at "sugar."

App.—August.

Loc.—Every wood in the neighbourhood of Plymouth; St. Germans;—Torquay, *R. B. R.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

353. **A. Tragopogonis,** *Lin.*

Pha-Noctua Tragopogonis, Lin. Sys. Nat. ii. 855.
Pyrophila Tragopogonis, West. & Hum. Brit. Moth. i. 151, pl. 30, fig. 13-14.
Amphipyra Tragopogonis, Staint. Man. i. 311.

Common, and widely distributed.

App.—July and August.

Loc.—Plymouth; Millbrook; Cotehele; Totnes;—Bovisand, *J. S. D.;* Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

Gen. **MANIA,** *Treit.*

354. **M. typica,** *Lin.*

Pha-Noctua typica, Lin. Sys. Nat. ii. 857.
Lemuris typica, West. & Hum. Brit. Moth. i. pl. 30, fig. 17-18.
Mania typica, Staint. Man. i. 312.

Common and almost general throughout Devon and Cornwall. Coming freely to "sugar."

App.—July.

Loc.—Embankment; Longbridge; Millbrook; Anthony; Liskeard;—Bovisand, *J. S. D.;* Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Exeter, *E. P.;* Alphington, *H. D.;* Barnstaple, *G. F. M.*

355. **M. Maura,** *Lin.*

Pha-Noctua maura, Lin. Sys. Nat. ii. 843.
Mormo maura, West. & Hum. Brit. Moth. i. 248, pl. 55, fig. 1-2.
Mania Maura, Staint. Man. i. 312.

Common from western Cornwall to eastern Devonshire, and from south to north Devon. Comes to the lepidopterist's "sugar" bait, and is half domesticated; fond of being in houses. A marked specimen has frequently returned to the same house after having been subjected to ejectments.

App.—June—August.

FAMILY—TOXOCAMPIDÆ, *Gn.*

Gen. **TOXOCAMPA,** *Gn.*

356. **T. pastinum,** *Treit.*

Ophiusa pastinum, Treit. Schmett. Europ.—West. & Hum. Brit. Moth. i. 246, pl. 54, fig. 10-11.
Toxocampa pastinum, Staint. Man. i. 313.

Not uncommon, but local. "Common at Barnstaple."

App.—June (end).

Loc.—Wembury; Kingsbridge-road;—Radford wood, *E. Lethbridge;* Torquay, *Dr. B.;* Teignmouth, *Dr. J.;* Barnstaple, *G.F.M.*

357. **T. Craccæ,** *Schiff.*

Noctua Craccæ, Wien. Verz.
Toxocampa Craccæ, Staint. Ent. Ann. 1863, p. 148, pl. fig. 3.

In one of his entomological rambles in the west of England, the Rev. Mr. Horton, of Worcestershire, became the fortunate discoverer of this new British *Noctua.* He states, in *Zool.* p. 8179, that he obtained four examples on the north coast of Devon. This new addition to the British list of *Lepidoptera* continues to the present time, in Britain, purely Devonian.

App.—Mr. Horton gives 24th to 28th July.

FAMILY—STILBIDÆ, *Gn.*

Gen. **STILBIA,** *Steph.*

358. **S. anomala,** *Haw.*

Phytometra anomala, Haw. Ent. Tran.
Stilbia anomalata, West. & Hum. Brit. Moth. 246, pl. 54, fig. 8-9.
Stilbia anomala, Staint. Man. i. 314.

In some localities common, in others rare, but in all local.

App.—August and September.

Loc.—Plymbridge; Bickleigh Down; Wembury;—Bovisand, *J. S. D.;* Torquay, *Dr. B.; R. B. R.;* Stokewood, near Exeter, *E. P.;* Haldon, *Dr. J.*

SECTION—LIMBATÆ, *Gn.*

FAMILY—CATOCALIDÆ, *Gn.*

Gen. **CATOCALA,** *Och.*

359. **C. nupta,** *Lin.*

Pha-Noctua nupta, Lin. Sys. Nat. ii. 841.
Catocala nupta, West. & Hum. Brit. Moth. i. 249, pl. 55, fig. 5.—Staint. Man. i. 315.

Scarce. Uncertain in the seasons of its appearance. Has not yet been observed in the Plymouth district.

App.—"1st week in September to the 1st week in October," *H. D.*

Loc.—Torquay, *R. B. R.;* Teignmouth, *Dr. J.;* Alphington, "where it came freely to 'sugar' in 1859, '60, and not since," *H. D.;* Barnstaple, *G. F. M.*

SECTION—SERPENTINÆ, *Gn.*

FAMILY—EUCLIDIDÆ, *Gn.*

Gen. **EUCLIDIA,** *Och.*

360. **E. Mi,** *Lin.*

Pha-Noctua Mi, Lin. Sys. Nat. ii. 838.
Euclidia Mi, West. & Hum. Brit. Moth. i. 252, pl. 56, fig. 11.—Staint. Man. i. 318.

Generally distributed and not uncommon.

App.—June.

Loc.—Open places in and near almost every wood for twenty miles round Plymouth;—Falmouth, ***Faun. Fal.***; Torquay, *Dr. B.*; Teignmouth, *Dr. J.*; Exeter, *E. P.*; Alphington, *H. D.*; Barnstaple, *G. F. M.*

361. **E. glyphica,** *Lin.*

Pha-Noctua glyphica, Lin. Sys. Nat. ii. 838.
Euclidia glyphica, West. & Hum. Brit. Moth. i. pl. 55, fig. 10.—Staint. Man. i. 318.

Rather more common than *E. Mi,* and occurring in the same localities, being a not unfrequent insect throughout both Devon and Cornwall.

App.—June, some seasons in May.

FAMILY—POAPHILIDÆ, *Gn.*

Gen. **PHYTOMETRA,** *Haw.*

362. **P. ænea,** *Schiff.*

Noctua ænea, Schiff. Wien. Verz.
Phytometra ænea, West. & Hum. Brit. Moth. i. 244, pl. 54, fig. 2.—Staint. Man. i. 319.

Generally distributed over Devon and Cornwall, on heaths and downs.

App.—June and July; (according to Mr. Dell, May and June.)

Loc.—Whitsand-heights; St. Cleer Down; Bickleigh Down; Ivybridge; Bolthead;—Torquay, *Dr. B.*; Haldon, *Dr. J.*; Exeter, *E. P.*; Alphington, *H. D.*

On this page is completed the third part of the Catalogue of the *Lepidoptera* of Devon and Cornwall, comprising all the NOCTUÆ at present authenticated as having occurred in the Counties.

The NOCTUÆ of Great Britain and Ireland, not including the Channel Islands, amount to exactly three hundred. Of these there are in Devon and Cornwall two hundred and thirteen well-authenticated species. This high proportion is doubtless a natural following, and consequence of the geological formations found in the two westernmost counties. The varied levels of country and the consequent temperatures lead in turn to the growth of a peculiar *flora*, and an abundance of insect life is the result.

Beside those enumerated in this Catalogue, there are a few other species of *Noctuæ* supposed to be inhabitants of the area under observation, but the evidence supporting their claims to be considered natives of the West requires further elucidation.

An appendix will follow in due course, when, with more knowledge, the list will probably be extended.

London, October, 1865.

END OF VOLUME I.

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Fig. 1.

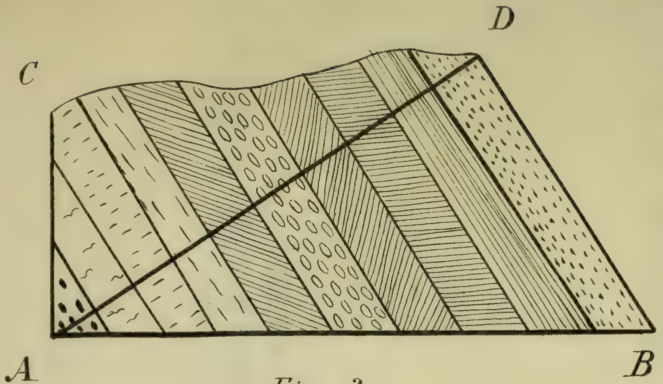


Fig. 2.

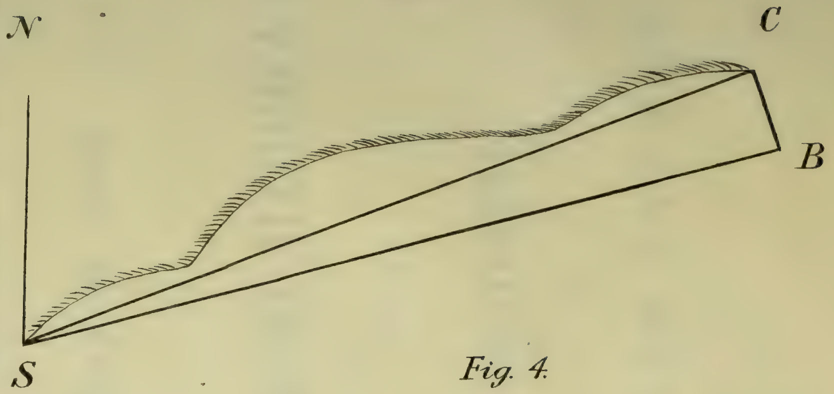


Fig. 3.

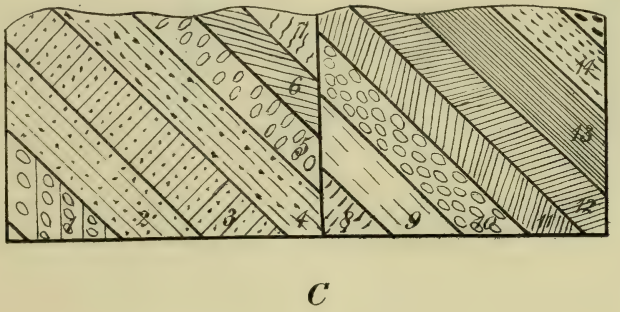
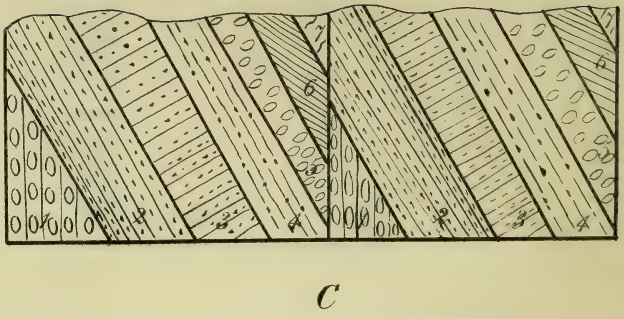


Fig. 4.



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